Cycle

OCTOBER 1974/**75 CENTS**

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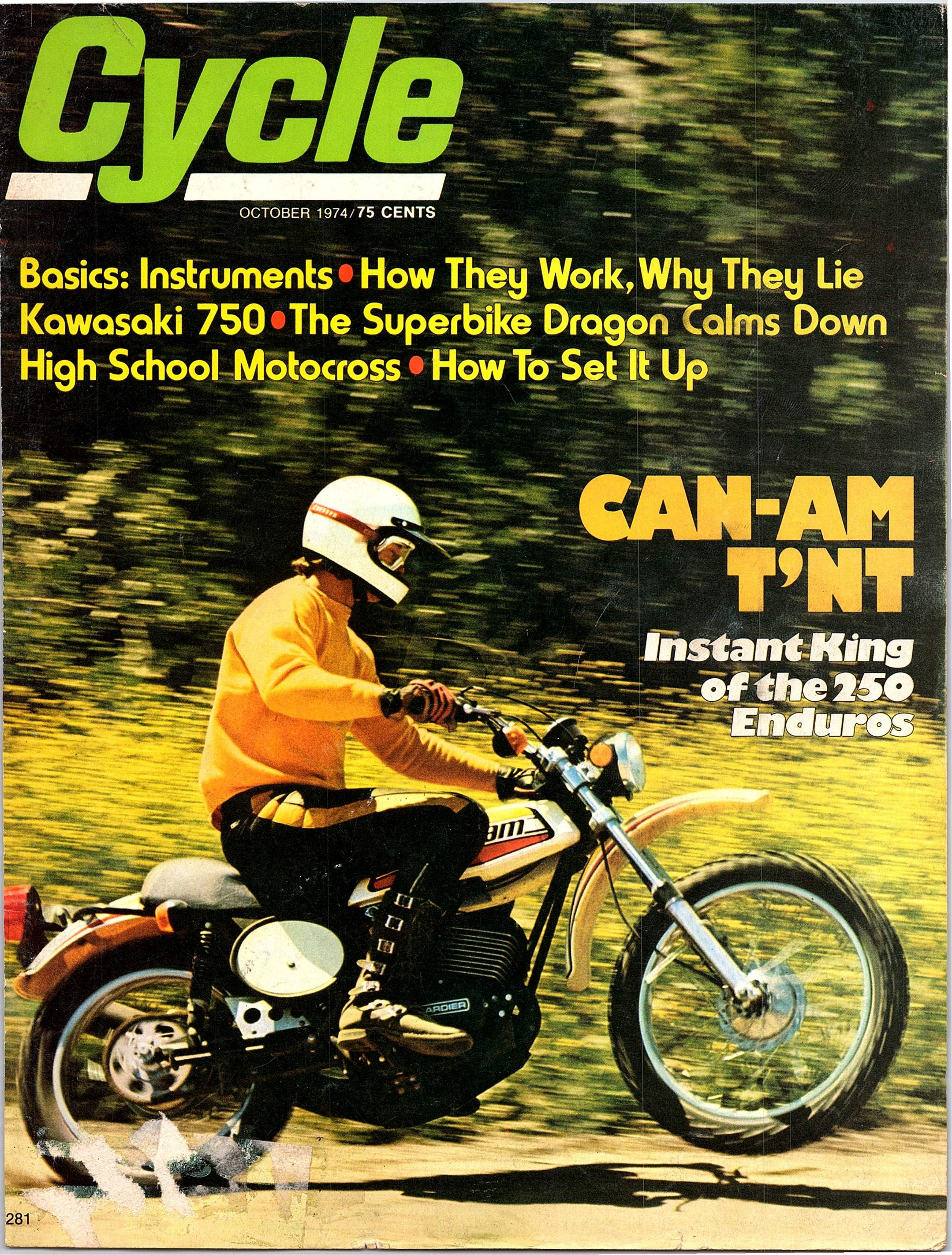

CAN-AM T'NT

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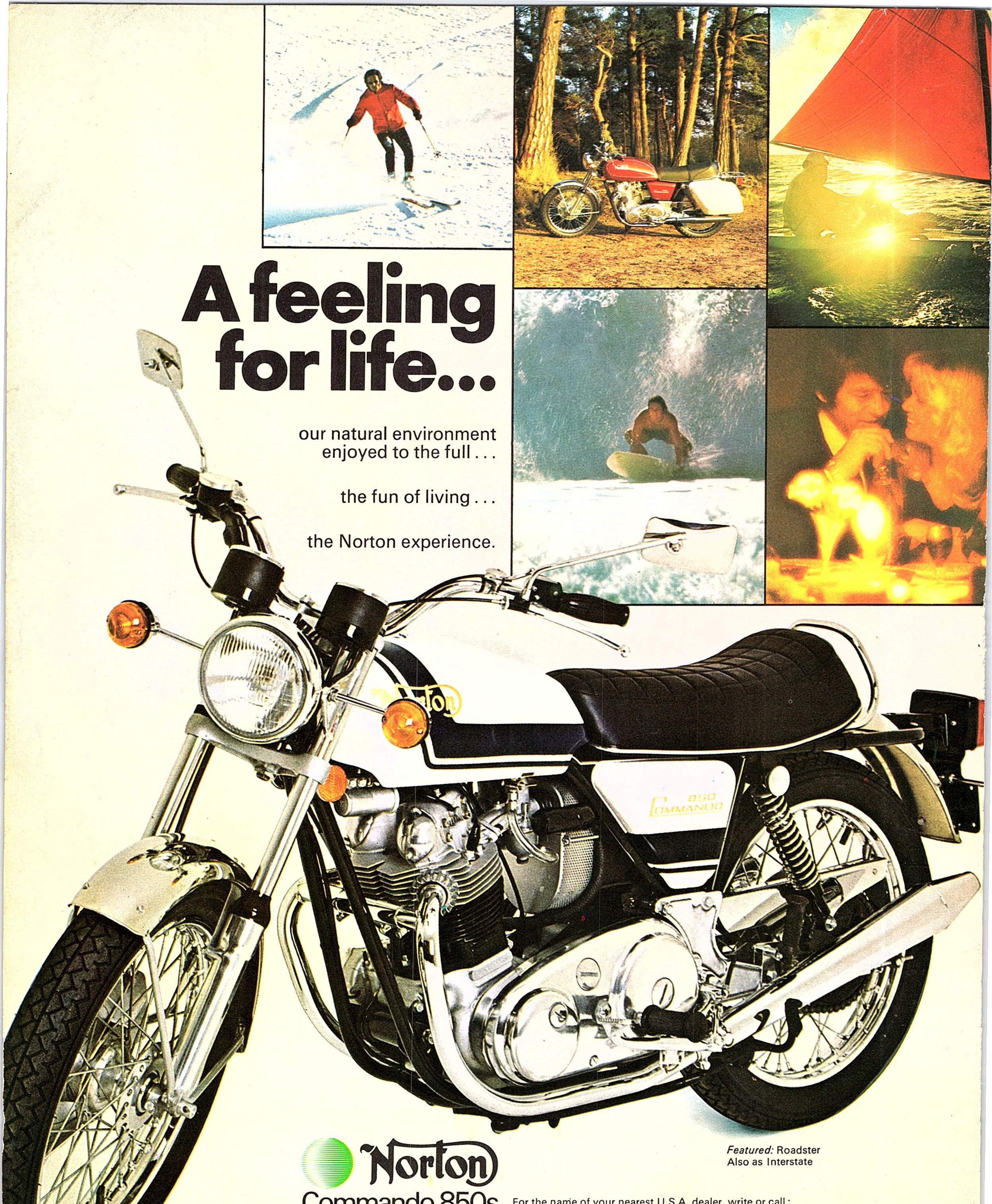

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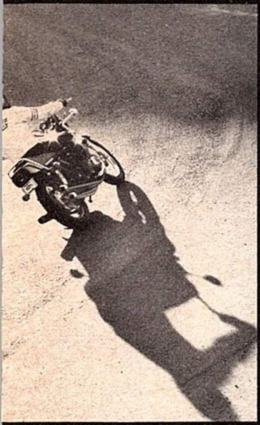

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This Month's Cover: Too often new companies pursue success by imitating success. But Bombardier, Ltd., competing in a market filled with talent, applied some real motorcyclist experience and some new concepts and has produced the best bike in its class—the 250 T'NT. Cover photography by Larry (I'm worried to death!) Willett.

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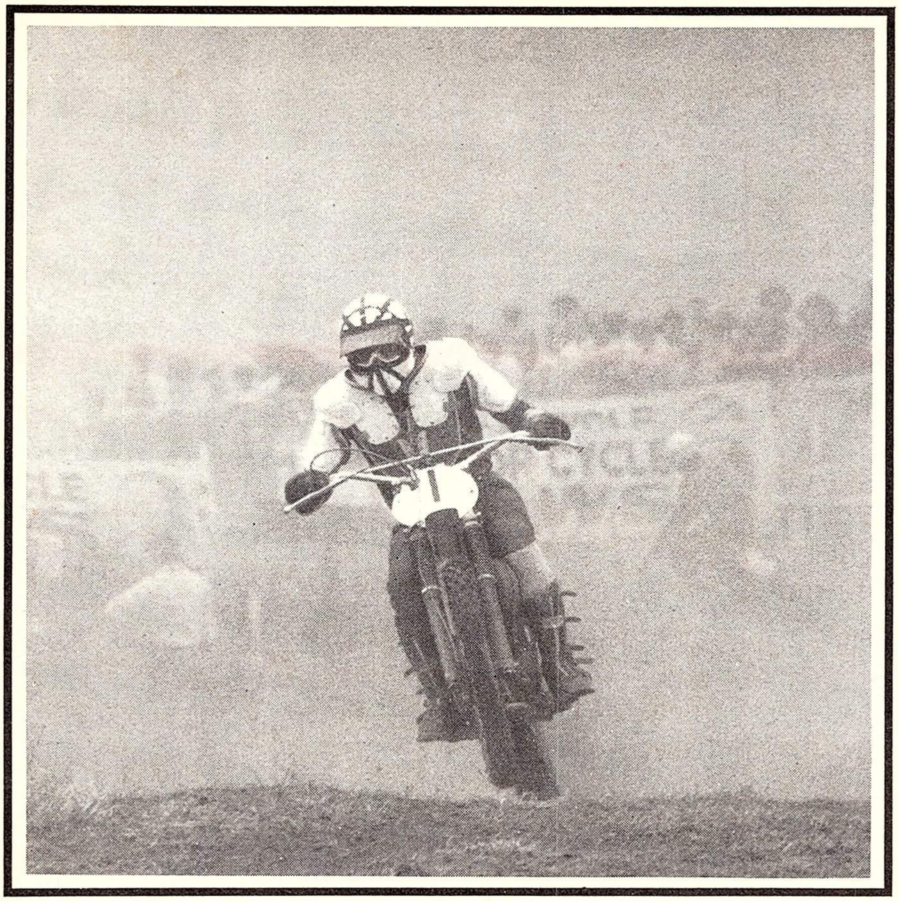

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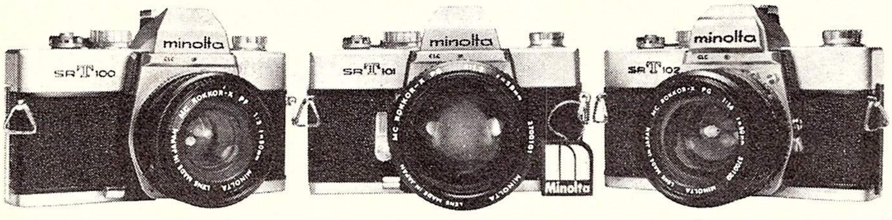

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(advertisement)

THE HONDA REPORT

October, 1974 HR #10

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Speno Award Goes to Honda R & D Engineers.

The Third International Congress on Automotive Safety, held recently in San Francisco, saw two engineers from Honda R & D Co., Ltd., of Japan, receive the Edward J. Speno Automotive Safety Award. Recipients of the award were Yoshinori Watanabe and Keigo Yoshida. The paper, entitled *Motorcycle Handling Performance for Obstacle Avoidance,* was judged best of all papers delivered at the second congress. Messrs. Watanabe and Yoshida, using sophisticated analyses, showed the high level of handling of Honda motorcycles; that the most important factor of all is the rider himself; and that his safety can be enhanced through thorough safety training.

1975 Honda Motorcycles to Debut.

The 1975 Honda motorcycle models will soon be appearing at Honda dealerships. In addition to some surprises in brand-new motorcycles, all models have been given added safety features and attractive new styling. Watch for them at your local dealers.

Hondaline™ Introduces New Touring Gear.

The array of Hondaline riding apparel continues to grow, with the recent introduction of special touring gear, designed to fit over commuter or road riding clothing. Now available is an attractive and protective all-weather riding suit with a reversible, reflective belt and many snap pockets. An enduro riding jacket and pants are also available. The third new item from Hondaline is a pair of riding boots that are attractive enough for wear at the office, yet are rugged and protective.

Marty Smith Becomes Youngest AMA-MX Champion.

Seventeen-year-old Marty Smith, Team Honda motocross racer, is the youngest motorcycle rider to ever become a national AMA champion. Marty won the 125cc class title riding his Honda Elsinore™ the very first year that the AMA officially recognized the class. Marty clinched the number one spot with wins in California, Utah and Kansas. Final 1974 standings in the 125cc class give Smith the #1 plate. The four Team Honda 125 riders swept the 1st, 2nd, 3rd and 4th positions!

Honda Donates Helmets and Safety Vests to MSF.

The Motorcycle Safety Foundation recently received an important donation from American Honda—a gift of 2,500 Hondaline helmets and over 1,000 High-Visibility Safety Vests. These items will help implement a safe-riding program, which consists of instruction seminars held in major cities across the country. High school driving instructors, law enforcement officers, military safety officers and others will receive motorcycle riding safety instruction which they will pass along at local safety classes to all interested motorcycle riders.

Honda Elsinore CR's are designed for motocross use only and are sold "as is" without warranty.

CIRCLE NO. 48 ON READER SERVICE PAGE.

Editorial

Stop the Thrills

• *(From the Chicago* Sun-Times):

Until a few years ago nobody cared much about statistics of motorcycle deaths or accidents. Now 4 million registered motorcycles are on U.S. streets and highways, a 536% increase in their use since 1961, and cyclists were killing themselves off in 1973 at the rate of 16% ahead of 1972 and injuring themselves 13.2% more in the same period.

Many doctors would ban motorcycles. "We call them 'murder-cycles'. They are disaster machines," said Dr. Levon K. Topouzian, chief of orthopedic surgery at Weiss Memorial Hospital.

"It takes a certain personality to be an alcoholic," said Topouzian. "It takes a certain personality to be drug-addicted. It takes a certain personality to ride a motorcycle."

Most doctors and nurses would stop the thrills. "It is simple," said Topouzian. "Just take the motorcycles off the highway."

* * * *

(From the Westlake *Times-Picayune):*

Ever since the discovery of porcelain humankind has been on a collision course with injury, death and worse. While the bathtub seems harmless enough it has been responsible for untold maimings since the days of Hammurabi, and the mounting toll of "bathtub" cases has local doctors and nurses whirling their proctoscopes in despair.

"The main problem seems to be a generalized belief that bathing somehow makes you feel good," said Dr. Wingfoot Crutch, Chief Orderly at the Westlake Hospital and Delicatessen. "But those of us in the medical profession have seen so many shattered bodies dredged out of bathtubs that we know better. Bathing is simply not good for people, over and above the accident risk. The 'good feeling' that descends on a bather as he steps from the tub is temporary, probably induced by hallucinogenic minerals seeping into the pores of the skin. Besides, it has never been soundly demonstrated that the human skin is in fact waterproof; we are presently engaged in a study of the correlation between excessive bathing and water-on-the-knee, one of humanity's great cripplers."

If people insist on taking baths, Dr. Crutch advises, several precautions must be observed. "First and foremost, the water level in the tub must not be allowed to exceed 2 inches. Second, the bather should equip himself with golf shoes to reduce the chance of slipping either upon entry or exit, and shoulder pads and a helmet in case he happens to slip anyway. Third, to avoid the problem of waterlogging the bather should coat his body with the proper mixture of rubber cement, creosote and caulking compound.

"Listen," Dr. Crutch concluded. "You know and I know that taking a bath is fun. You leap in either alone or with a companion, lather up, play in the bubbles and push the tub-toys around. But we in the medical profession see the tawdry, tragic underside of the whole bath tub situation, and we would be remiss both as doctors and as human beings if we didn't recommend the immediate confiscation of every tub in Westlake. Certainly we can foresee difficulties, especially from the tub industry, the Civil Liberties freaks and Colgate-Palmolive. But all this killing and maiming simply has to stop. People might not have as much fun or smell as terrific as they once did, but at least they'd be alive."

* * * *

(From the Washington DC *Porkbarreler):*

The Annual District Psychiatry Convention was held at the Sheraton Hotel here yesterday, and the conclusion reached by august psychiatrists from far and near was that the profession of politics could no longer be deemed conducive to satisfactory health and should be banned forthwith from the District and its environs.

"None of us is exactly sure when the profession grew too dangerous to be condoned. We think that politics first became psychologically debilitating when the general public literacy rate climbed to the level of the hand-stapler," commented Dr. H.D. ("Head") Candler. "In the good old days, why, voters used to attend political rallies for the beer and chicken, and then go to the polls and vote because their wives liked to gossip with each other. It was a harmless profession. So what if a bunch of old big-talkers got themselves elected and moved to Washington for a few years at the public trough? It didn't really make any difference one way or the other, until the press started paying attention. Boy! Just look at the profession now. Until 1973, our figures show only .004% of all politicians had to face the trauma of getting their hands caught in the till, and only a tiny percentage of those actually went to court and faced a jury. But in 1974 more than 35% of all licensed, card-carrying politicians were nabbed either influence-peddling, consorting with the Mafia, operating as bag-men, receiving kickbacks, breaking into private homes and offices, obstructing justice, removing labels from pillows and driving in excess of 55 mph.

"Our studies have pointed out that before these men became involved with politics they were reasonably honest, God-fearing, home-loving, industrious, intelligent men. And then as soon as they won a high public office it all came down like a house of cards. Interviews show that before they were elected they thought of politics as something enjoyable, something rewarding. Service to the country, that sort of thing. A noble profession—certainly not a dangerous and debilitating one. But after a couple of years they develop symptoms of Phelanges Stickeremia, followed by Nono Commentemia and Nolo Contendremus, and ultimately the completely immobilizing Hotelus Crossbarus, which can remain a problem from two to 20 years. And even after they finally shed the Hotelus Crossbarus syndrome and return home, they still display evidence of chronic psychological disturbance. One of our recent cases, in fact, sat before a typewriter and wrote fairy tales for 16 consecutive months, and then went out and tried to sell them!

"It's quite tragic, this startling increase in the rate of disturbed politicians. If our great nation wants to continue boasting about the mental health and general well-being of its citizens, then it must see its way clear to protect the population from itself. A good start would be to isolate and ban all professions and hobbies that we know cause mental distress. Politics, of course, should be the first to go."

* * * *

(From the Unionville *Horsefeather):*

Reinhold Petcock, a local motocross champion, stepped into his bathtub two nights ago clad in the required golf shoes, shoulder pads, helmet, rubber cement, caulking compound and creosote, and had what he called, "the shock of my life." Sitting there in Petcock's two inches of water, much to Reinhold's surprise, was

(Continued on page 15)

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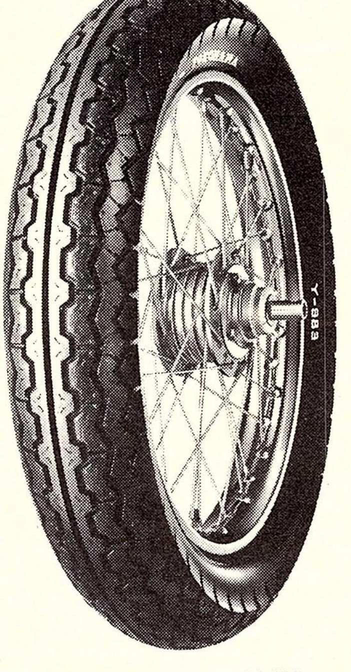

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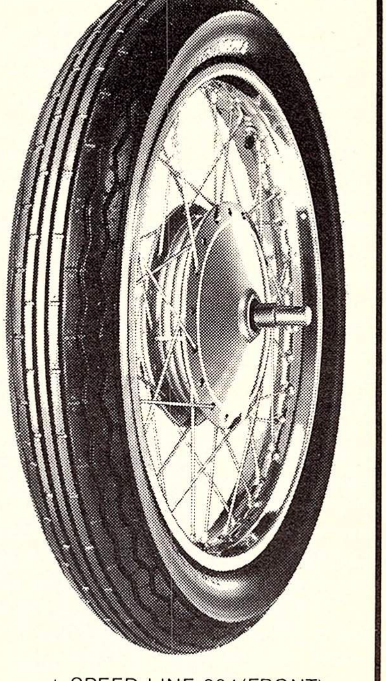

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CIRCLE NO. 25 ON READER SERVICE PAGE.

Pipeline

Money Racing

● Motorcycle journalists are genuinely concerned with the well-being of international roadracing even if facetiae sometimes obtrudes on the carefully balanced judgments. We recognize the widening appeal and spread of roadracing and the decay of xenophobia. Europeans now race at Daytona, Americans compete at Imola and in Britain, and Kenny Roberts displays more than a passing interest in FIM Grand Prix competition (grabbing third in the Dutch TT). It's satisfying to see the international set coming and going foremost as roadracers—as *equals*. We've no regrets that the enmity which marred early attempts at Transatlantic compatibility has ceased to exist. And insidiously nationalistic laws and introverted interpretation of the rules have largely become things of the past.

Admittedly, the FIM is apparently able (and only too willing) to clamp a stultifying brake on progress, witness the TZ750 ban. But minor FIM ineptitudes will only impede, not halt, the advance. It's a simple case of supply and demand. Nothing will stop 750 racing if riders are paid to race a particular class of bike (and/or engine), if manufacturers supply the right machines, if promoters stage big-buck events, and if national federations endorse the efforts. Obviously the AMA and ACU are doing and will continue to do just this. Therefore we probe, question and criticize (sometimes too harshly) our local brand of roadracing, looking for improvements to benefit *international* racing and racers.

The June-time gathering of British journalists in the Isle of Man could be described as a joyful annual pilgrimage to the Tourist Trophy Races, were it not for the profound depression which inevitably descends on our get-togethers. For, you see, we journalists worry over the TT's drift towards possible oblivion, and regret that the TT isn't the thing it was. Knowing full well it can never again be the same, we search our souls, wondering whether we should continue to support a rundown TT. We might pose the hypothetical question: "What can we do with the TT?" And we'll receive coloquial replies summarized as "Stuff It."

However, the Isle of Man authorities and the ACU see the TT as no subject for cynical humor. The TT is an irreplaceable source of revenue for the IoM; it's the biggest single tourist promotion. Tenaciously the men from the ACU extol the TT as "the world's greatest roadrace," though some have the decency to blush, knowing their protestations fall on many a deaf ear. They concede that a great act of rejuvenation is essential to put the TT back on a prestigious footing. But they are so tied to the TT's traditional format, they set themselves the impossible task of "restructuring the TT without actually touching the TT."

Fatefully, the period of TT decline saw Daytona's elevation to worldwide fame and acclaim, but the significance can be more imaginary than real. It was, in fact, sheer coincidence. Daytona had no direct effect on the TT's prospects; indirectly the written editorial words evaluating the relative merits usually came down in Daytona's favor. Yet there was no good reason why the TT could not have flourished well apart from Daytona. The two, after all, had precious little in common. They did not operate in direct competition.

Inexorably, the march of events nearer home precipitated the TT's slide towards possible ruin. There was the widening spread of world championship meetings which undermined the TT's value; the spread permitted riders to collect championship titles while deliberately ignoring the IoM. There was a growing disenchantment with the TT, and riders openly derided the theory that the inherently perilous 37¾-mile "mountain circuit" was a challenge they could not afford to ignore. There was the unanimous decision by the star riders that the TT could somehow get along without their services, a revolt indicative of a new breed of works riders able to dictate their own terms. Then followed the crushing blow of the GP factories underwriting their riders' ban. By 1973, the anti-TT faction ranged in full cry. None of the regular GP factories sent along entries. No solo world champions came to the start line. Much of the opposition was concerned with time and money; the two-week spell in the island was ill-spent for small reward.

Many thought the cash-flow was the beginning and the end. They rebuked the ACU for bumbling along in amateurish ways. The ACU suddenly discovered inveterate longing to embrace the money-is-irresistible theme; it demanded bigger contributions from the Isle of Man. The IoM responded with a record $180,000 for 1974. Everybody sat back and waited for the great stampede of stars. No chance. The aces remained mute and remote. In desperation the Isle of Man treasury indicated a further sum was available, conditional on the stars being signed. Accordingly, an ACU official sallied forth on the assignment: "Get Read and Agostini" (the rest will follow).

Rumor put the top inducement for Read at $16,800. Rumor exaggerated; the actual sum offered as a basis for discussion was nearer $6,000. The offer, in any case, crashed onto stony ground. Read said *"No,"* Ago said *"No,"* and almost every world-ranking rider turned away—big-money come-hithers and all.

TT apart, an essential thing to realize about roadracing professionalism in Europe is that world championship meetings provide only a proportion of a top rider's seasonal earnings. Nowadays, the proliferation of prestige one-day meetings on the Continent presents riders with unparalleled opportunities to pick and choose—and to accumulate wealth. By spurning the TT for instance, Read freed himself to race at Chimay (Belgium), probably picking up $3600 in start money. From Belgium, he made a quick trip to England and Mallory Park's "Post TT" international and a bigger payout.

Of course, the sums are necessarily approximations, since promoters/riders games are played pretty damn close. Sometimes the figures need a bit of swallowing, as with Ago's purported $7200 for Chimay. But assuredly there are meetings where the top four star riders receive $6000 over and above prize money expectations. Add on two winning purses and one rider goes home $10,000 happier. Not bad for an afternoon's work.

It's a sort of world turned upside-down situation, with the FIM Championship meetings doling out miserable offerings when compared with the "ordinary" internationals. World championship pay is controlled by an FIM system of guaranteed minimum rates (based on the previous year's points total). No such niceties inhibit the dealings related to Mallory, Chimay and elsewhere, where starting-line tariffs are strictly negotiable. As one promoter put it, in a rash moment of candor: "At our world championship GP we pay riders what the FIM believes they are worth. Other times we pay the riders what we know they are worth."

Quite simply, the organizers of world championship GPs have captive performers (they are chasing points; they must compete) and a captive audience who want to see the stars. Promoters pay riders bearing points, who may or may not be crowd pullers, because it is law. They'll brush aside the reasonable demands of renowned performers who, for various reasons, have recorded no 1973 scores. Paul Smart knows. Although racing a works Suzuki 500cc square-four exotic, he sticks rock bottom on GP lists for starting gold—"not enough to cover

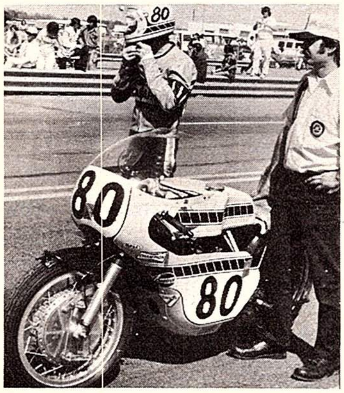
(Continued on page 18)

Castrol News

Castrol Oils, Inc. Lubrication Excellence Since 1899 Member Burmah Group

Cycles on Castrol Sweep 1973 Competition

Dramatic Wins in 1973 Motorcycle Competition proved it—AMA, ISDT, AMDRA—Castrol lubrication was the right way to go. The season's results were overwhelming. Top cyclists driving Castrol-lubricated machines swept the board capturing every No. 1 Expert Class spot in AMA-Sanctioned Road Races. The trend began with successes at the Daytona Classic: First 5 Places, Expert Class; First 3 Places, Combined Class; First Place, Novice Class. All on Castrol! When the action moved to Dallas, Castrol lubed all 1st Place Leaders in the Expert, Combined, Junior and Novice Classes. Later at Atlanta, Castrol lubricated the First 5 Places in both Expert and Combined Classes plus the First 3 Places in the Junior Class. At Loudon, N.H., bike-riders using Castrol rode off with the First 3 Places in both Expert and Junior Classes. During September, trail-riding cycle buffs made tracks to Dalton, Mass., where the U.S. hosted its first International Enduro Race; the 48th Annual ISDT. Here, Castrol broke the language barrier and shared the spotlight with the 1st, 2nd, 3rd and 4th position Trophy Teams—Czechoslovakia, Great Britain, Austria and West Germany—in the World Trophy Event. And with SMK EKSJO (Sweden) for the 1st Position Club Trophy. To the track and trail spectator, it was a mighty successful year for Castrol-lubricated machines. But before 1973 bowed out, AMDRA—American Motorcycle Drag Racing Association—totaled its Final Point Standing and named Sonny Routt No. 1 in Motorcycle Drag Racing. What does Sonny use? Castrol, of course. Thank you for this honor Gentlemen and Good Luck in 1974.



1974 Marks Castrol's 75th Anniversary

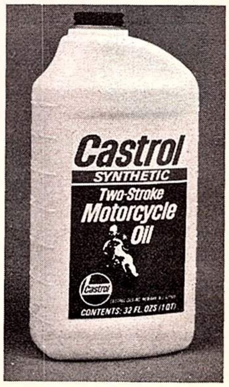
Back in the early 1900's, there were approximately 35,000 motorcycles on England's roads. And the Isle of Man Senior T.T. Races of 1911, 1912 and 1913 were won using petrol and a unique lubricant known as Castrol R. The nostalgic growth of Castrol Oils closely parallels the historical development of motorcars, motorcycles and aeroplanes. In the early days, it was the Castrol brand that offered life-giving lubrication to many of the new fangled internal combustion engines. During WWI, it was a Rolls-Royce engine and Castrol R that urged Handley Page bombers to advantageous heights on cold days. In the record-breaking 1920's and 1930's, Castrol Oils played an active and decisive role in speed and endurance feats, on land, sea and in the air. Wherever, whenever a need or dream arose, Castrol and its quality lubricants were involved; serving cyclists, motorcar owners, inventors, pioneers, adventurers and sportsmen. It was out of this wealth of experience that Castrol developed Castrol GTX, the world's finest motor oil. This year, Castrol celebrates its 75 years of dependable service to men on the move. It has been a gratifying generation of achievement since that day in 1899 when a very perceptive gentleman, Charles Cheers Wakefield, opened his modest office in London.

Castrol Oils, Inc. is pleased to announce that Fork Oil is now available in 20 and 40 grades. These two new grades permit cyclists to make moderate adjustments in their front fork shock action, simply by replacing the present fluid for softer or firmer ride.

New Product, New Packaging Creates a Contrast at Castrol

When Castrol Oils introduced its Synthetic Two-Stroke Motorcycle Oil last October, few cyclists realized that this newest cycle lubricant would share a very popular plastic container with the oldest cycle lubricant in the world: Castrol Castor-Based "R" Racing Motor Oil. But the "new look" plastic container offered certain features that cyclists appreciated: the container is graduated for measured use and a screw-on cap keeps the unused oil free from contamination. To date, competition riders haven't found the lubricant to surpass Castrol R for "hot surface cling"; a quality in demand when cycle engines operate at ultra high speed, high temperature and high torque. Popular Castrol R has endured the test of time. And for two-strokers: Castrol Synthetic Cycle Oil is an entirely new development in lubrication engineering. It's 100% pure synthetic; clean-burning, non-smoking and non-polluting. Superior lubricity (oiliness) enables two-stroke owners to use it at one-half the recommended fuel/oil ratios—up to 80:1 — with complete lubrication and protection. At Castrol Oils, there may be contrast. But there's no generation gap.

Castrol Castor-Based R



Castrol Two-Stroke Synthetic

CIRCLE NO. 23 ON READER SERVICE PAGE.

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AMERICA'S NO. 1 ENGINE CLEANER! Spray it on . . . hose it off! Removes grease and grime . . . on autos, tractors, mowers, etc.

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TAR AND BUG REMOVER
Quickly dissolves tar spots and loosens bug deposits from autos, motorcycles, buses, etc.

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Biodegradable, phosphate-free! Use ⅙ oz. per gallon of water. Rinses streak-free.

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Stops automatic transmission troubles . . . down-shifting, rough shifting, slippage . . .

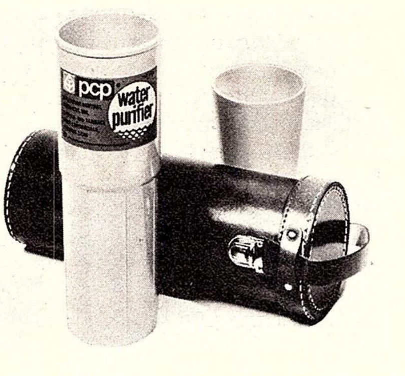
LAN-LIN
Gets hands REALLY clean! Removes oil, grease, paint. Rub on . . . Rinse or wipe off!

RADIATOR SPECIALTY CO., CHARLOTTE, N. C. 28237

CIRCLE NO. 38 ON READER SERVICE PAGE.
Liquid WRENCH
THE SUPER PENETRANT
FREES RUSTED BOLTS AND PARTS
It melts the rust away!
TRANSMEDIC
STOPS TRANSMISSION TROUBLES
LAN-LIN
HAND CLEANER
"Rub on... Rinse or Wipe Off!"

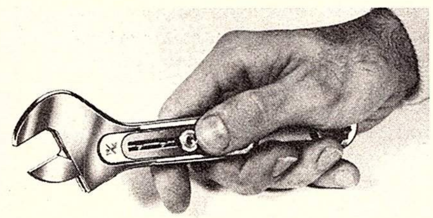
Newsline

Water Purifier: This portable water purifier could be invaluable when you're camping or taking extended rides into the back country, desert or woods. Discovered by old Baja traveling and racing veteran Dick Cepek, he has used it for his treks out of the country also. Cepek claims the purifier will make up to 1500 gallons of safe, pure drinking water. The filter is made of oligodynamic silver and activated charcoal. Cepek also says that the Johns Hopkins University has confirmed that the silver method of water purification kills 100% of Pathogenic (disease carrying) coliform bacteria. The kit is complete with tumbler and 3" x 9" travel case. Available for $19.95 Postpaid (Calif. residents add 6% sales tax) from Dick Cepek Inc., 9201 California Ave., South Gate, CA. 90280. Free catalog also available.



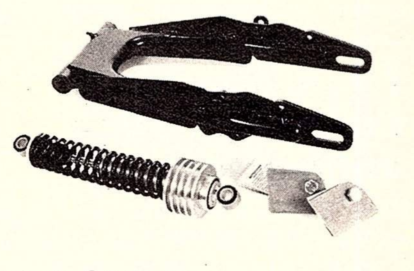
CIRCLE NO. 1 READERS SERVICE PAGE

Adjustable Wrench: One of the latest novel items from Brookstone's Hard-to-Find tool catalog is their Thumb-Slide adjustable wrench. Adjustment of opening sizes is accomplished by sliding the thumb adjuster up and back. Opening sizes range from 0 to 15/16" (0 to 24mm) with an 11/16" box broach at the wrench's end. Made of drop forged chrome-vanadium steel the wrench is 8" long. It lists for $9.10 postpaid from Brookstone Co., 8192R Brookstone Bldg., Peterborough, New Hampshire 03458. A 60 page catalog is also available.



CIRCLE NO. 2 READERS SERVICE PAGE

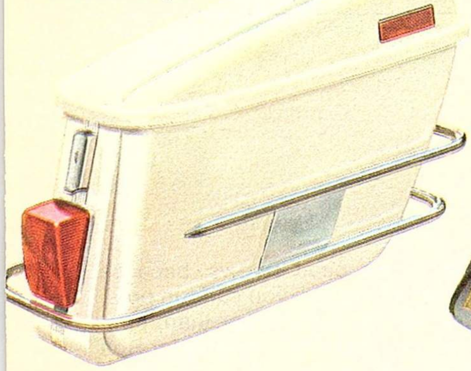
Forward Mount Kit: The newest winning edge in motocross is the forward mount shock set-up that is being used by all the grand prix works bikes. While not able to duplicate a works set-up this forward mount kit from Competition Dynamics appears to be well thought out and complete. The kit includes a modified, reinforced swing arm, Koni shock dampers with an additional finned aluminum cooling body, S & W springs and top mounting plates for your machine. Available for Yamaha 250, 360 & 500 MX and enduros, Husky 125, 250, 400 & 450, TM Suzuki 125, 250 & 400 and Honda Elsinore 125 & 250 MX and enduros. Swing arms range from $61.95 to $66.95 and the shock kits list for $115.00 per pair. Information available from Competition Dynamics, 5835 N. 16th St., Phoenix, AZ. 85016 or call 602-263-9397.



CIRCLE NO. 3 READERS SERVICE PAGE

Motocross Goggles: Designed for use with open helmets the Shur-Fit line of eye protective lenses include items designed just for motocross. The black, semi-soft rubber housings have a foam backing to aid as an air seal against any facial contour. The elastic bands are adjustable. Fogging is reduced with top and bottom ventilation holes. Tear-off lenses are available as extras although two come with each new pair of goggles. Clear and dark lenses are also available and the housing comes in either black or white. Suggested list is $6.00 each. Available from most motorcycle dealers or write to Circle Industries, 17901 Arenth Ave., City of Industry, CA. 91748 for information.

CIRCLE NO. 4 READERS SERVICE PAGE



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Bags in black or white
plus striping. With stop,
tail and turn light.

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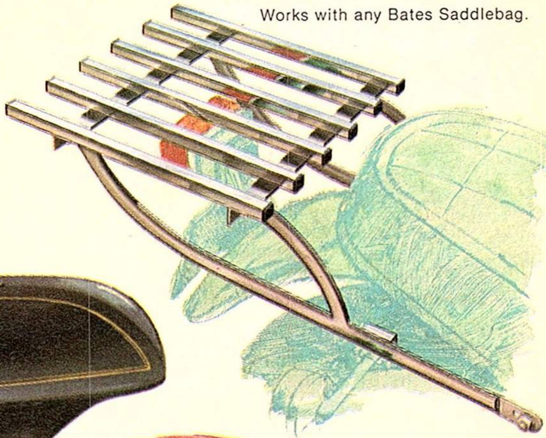
models and
colors.



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any rack. Holds two helmets.
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All new
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colors, striping etc. Holds
helmet and more.

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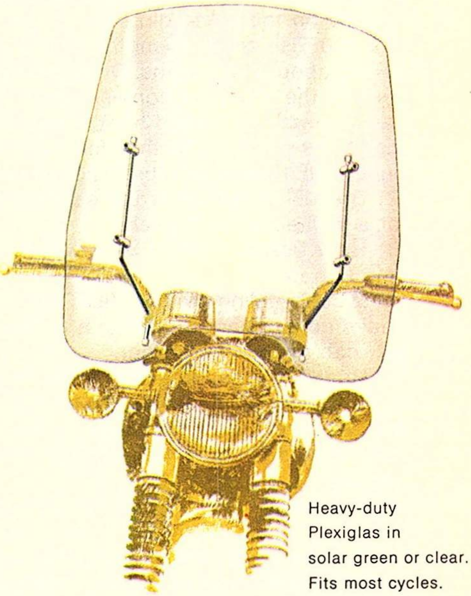
Ride-Off Stand.
Mount together
or separately.

If you or your cycle are not equipped with Bates, you're missing the pride and pleasure that come with owning the best. Miss no more. Bates has a hard-earned reputation for quality won over the past 25 years by persistent attention to detail. That's why it's the brand you can buy with confidence.

You fill in the blanks below and let Bates fill in the blanks in your life.



Heavy-duty
Plexiglas in
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Fits most cycles.

Make and model of cycle ____
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☐ Bag Mounts—$19.95 ☐ Bag Guards—$24.95 .... ____
Fiberglass Saddlebags
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☐ $2.00—Send me complete Bates Catalogs including Leather Samples

Letters

Pursangs And Turkeys

No doubt this letter will be one of many you will receive telling you that you are wrong about the 1974 250 Pursang you tested in the July issue. Okay, you are wrong.

I've been very actively engaged in riding for 15 years, and with all the dirt bikes I've owned, including 8 in the last 2½ years, none of them are in the class with the Pursang JPR.

Obviously you had a very well used test bike, as you noted it had been tested previously. You also noted you had a pinhead-size crankcase leak, and we all know that regardless of where the leak vents to, there goes all the old power.

To correct you on a few other points, (on which I can speak with authority):

(1) Speed—My 250 (stock) will outdrag a 125 Elsinore *with* GP kit by about 15–18 bike lengths in 250 yards. It will outdrag a 360 Yamaha MX (1974) about 4–5 bike lengths on the same dirt strip. It will do in a 250 Elsinore 6–7 lengths, and a 250 GP CZ about 7–9 lengths. On an MX type surface the YZ is no contest either, because it was patterned after a bird and tries to fly sideways all the time. Now the punchline: I weigh 240 lbs. ready to race.

(2) Brakes—The front is the best except for a well-adjusted Yamaha.

(3) Rear Brakes—will lock the wheel any time I so desire.

(4) Wheels—Mine are not out of line, and I have never heard of this on a Pursang, so I can't comment further.

(5) Rear Tire Pressure—I run 4 psi in mud, 8–10 psi normally, 10–12 psi on a very hard surface. I've had this bike 6 months. I still have the original tube. The tire does not slip.

(6) I've never bent an axle (on any dirt bike).

(7) The Elsinore forks are a joke compared to mine (yes, experience speaking).

(8) The Amal does not leak, or at least it has not leaked on my last three 250 Pursangs, '71, '73, '74.

(9) Jetting—You are correct. They come too rich stock. No dirt bike ever manufactured has ever, or will ever, come jetted right for every track in all 50 states. By being jetted rich you *turkeys* were not able to ride it. Try a 470 main, 109D needle, 35 pilot, needle in center. (This is the jetting factory Buls run.)

Finally, (at last, whew!) you said many of the great things were bad, which was a mistake, but you did not cover the real goofs on the bike:

(a) Breakable fenders

(b) Gas tank and side panels crack

(c) Rear spokes are fragile

(d) Engine and pipe paint goes away in one day

(e) Fork vents cover you with oil on hard compression

(f) Poor stock front tire (rear is great as you said)

If you want to see a proper test of the new Pursang, look at the recent tests conducted by other magazines. You just got blessed with a terrible test bike.

John McAlpine
Nashville, Tenn.

No. We were blessed with two terrible Pursang JPRs—Ed.

I enjoyed your test of the 250 Bultaco "Pomeroy Replica" in the current issue of *Cycle,* and agree with most of the opinions expressed therein. I had one of the first blue-tank 250s in the country. Compared to the previous Bul 250, the new one is considerably easier to ride at a faster speed.

But getting to the point of this letter, I spent a lot of time conversing with the good fellows at Bul headquarters in Virginia Beach. They told me that the bike *was not* officially designated as a Pomeroy Replica, but many Bultaco dealers were tagging it thusly. Their organization was not actually sanctioning such a name, but they weren't discouraging the dealers from using it either. I have no idea whether the bike is not officially designated a JPR, but last winter it definitely was *not.* Perhaps you made a mistake by basing the main premise of your test on the bike's supposed similarity to Pomeroy's machine. If not compared with Jim's bike, the new over-the-counter 250 stands in a little bit better light.

Pete Szilagyi
Austin, Texas

I have just read your test of the Bultaco Mk. VII 250 Pursang (Pomeroy Replica), and I cannot let such trash go uncriticized.

To begin with, you must have put concrete in the tires for the weigh-in. On an AMA correct scale, the Pursang (fully topped-off with gas and oil) weighs 211.5 pounds. It seems to me that you have your scales adjusted for a Harley-Davidson Electra Glide. Subtracting 13 pounds for gas and oil it weighs 198.5 pounds dry. The FIM limit for 250cc motocrossers (in case you don't know) is 194 pounds dry. The Bul is only 4.5 pounds from being illegal. Have you looked at the weight of Maico's 250 Grand Prix bikes lately? They're "slightly" over 200 pounds.

You must have had someone put the rip on your tire bead screws, because when they're installed, you can run pressures as low as, if not lower than, conventional rim locks allow. And as for Ron Pomeroy's stiffly sprung 'Sang, you must have been trying to ride at the speed of a trials rider through an extremely difficult trap. If you would have turned the little rubber-gripped handle on the end of the right handlebar wide open, I'm sure the stiffness would have disappeared.

As you may have noticed, I am a dirt biker. I am the proud owner of a Rickman Metisse 125, and I out-race a friend on an Elsinore CR 125 all the time. Apparently, this can't be so because the Honda is the speed-king of the 125 class. Well, I've got news for you: Motocross is not just a drag race. There happen to be a few turns thrown in, along with jumps, whoop-de-doos, and other such trivia. Motocross is won in the turns, on the jumps, and sometimes in the rough places. Maybe that can explain why Bultaco is winning. They have fantastic riders and outstanding bikes.

Tony King
College Park, Ga.

Our scale is inspected regularly and approved for accuracy by the California Dept. of Weights and Measures. We don't know about the AMA's scale—Ed.

Against the Wall

Jim Greening's words ring loud and all too clearly. BSA, two years ago the leader of the British motorcycle industry, is dead. Triumph, the most popular division, is, at least, alive. Even though "us" and "them" have combined for survival against the Japanese onslaught, it'll never be the same.

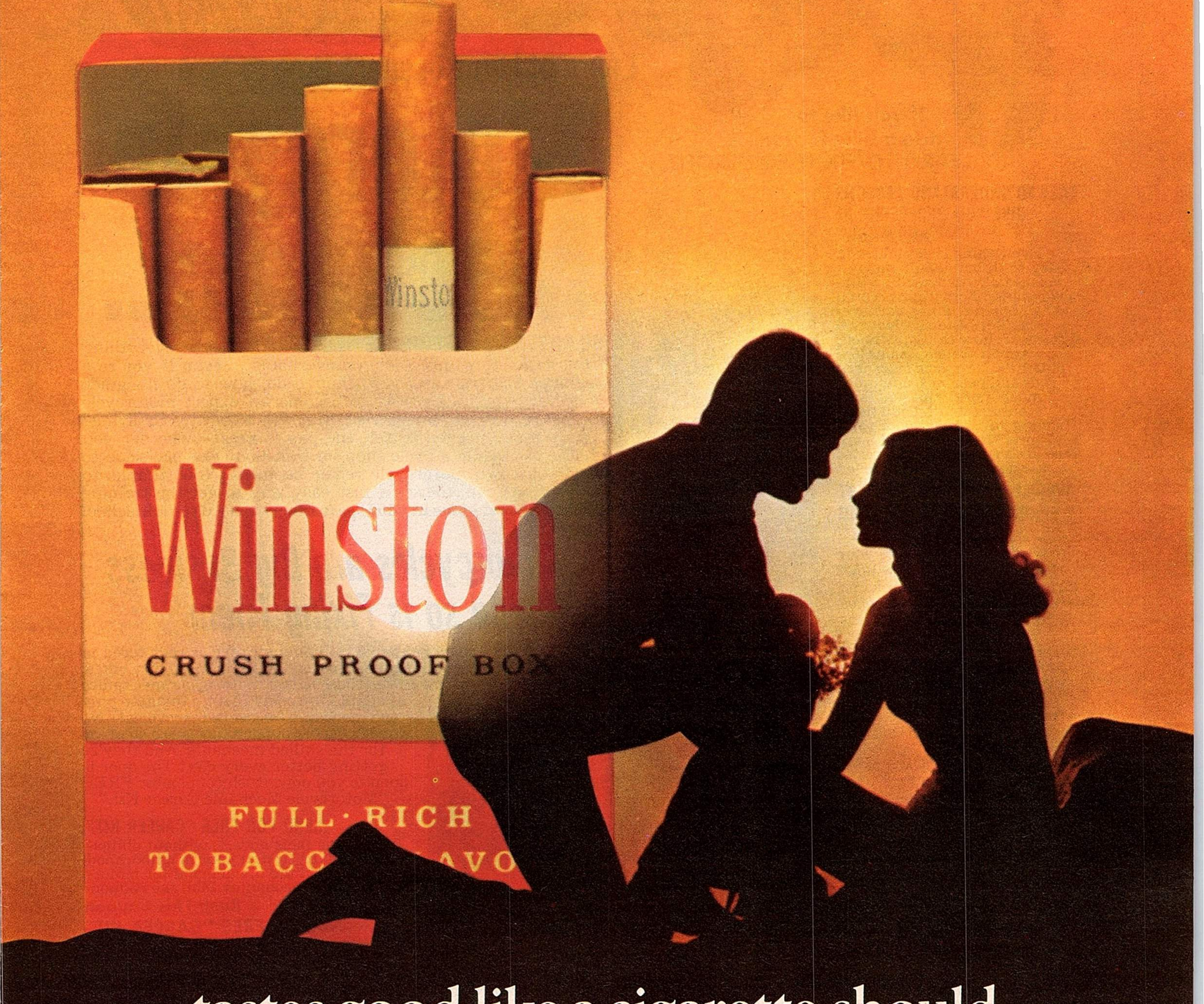
The British are the fathers of the motorcycle world. All the technical niceties that the Japanese provide so economically, with a few exceptions, have seen the light of day on some British bike at one time or another. That fact alone is saddening, for the British failed to exploit their technical advantages by providing their machines with them. At one time they did but, not as of late.

Great Britain's motorcycle industry suffers the same maladies that the rest of their industry has. Production processes have had little real advancement and this is where it hurts the most. Japan takes the technical goodies, mixes them with modern production and presto they turn out the kinds of bikes that, even the British, are forced to copy, in part anyway.

Like Dennis Poore this writer is hopeful

(Continued on page 27)

Winston



tastes good like a cigarette should.

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20 mg. "tar", 1.3 mg. nicotine av. per cigarette, FTC Report MAR. '74.

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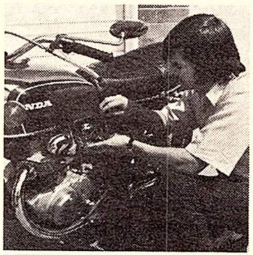

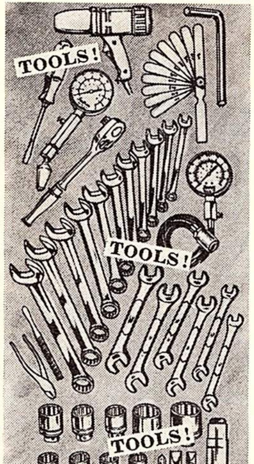
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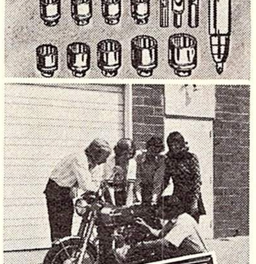

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EDITORIAL *Continued from page 4*

James ("Shoetongue") Cosanostrella, well-known Assemblyman from Chester County, inspecting Petcock's "Squeaking Duck" toy. "Boy, he really looked strange, and when he saw me he gave out with this little yelp and kicked me in the shin with his golf shoe, whereupon he fled," Petcock recalled.

"Well, my leg looked to be in pretty bad shape, and I figured I'd better get myself to the hospital as soon as I could. So I called on the telephone. No answer. Blood was running all over the place. I called again, and finally they sent over an ambulance. Strange ambulance—it had a device like a taxi meter running on the dashboard, and I had to pay the guy $14.95 before he'd let me go into the hospital. Thirteen dollars was for the fare; the other $1.95 was an extra charge because he turned on the red lights and blew the siren.

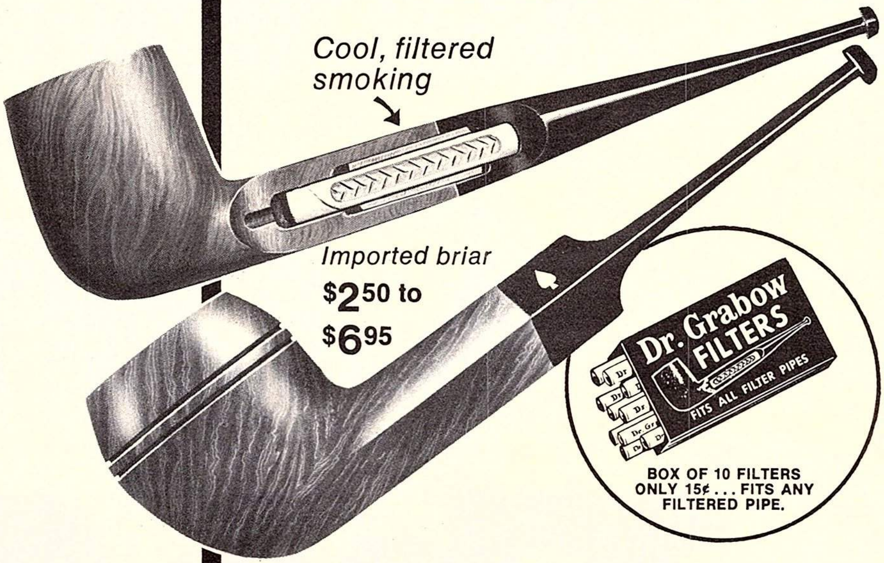
"As soon as I got into the emergency ward they made me fill out a bunch of forms, which took two hours and twenty minutes. By then I had lost four gallons of blood. I knew it was that much, because as soon as the forms were filled out they weighed me, and I was 24 pounds lighter than usual. I kept telling them that if they didn't pay attention to my shin I was going to leak dry, but they kept on doing silly things. They checked my eyes, and then my reflexes. They checked me for a hernia. They tapped my chest, and my back. They took a bunch of X-Rays of my hands and arms, inspected my fingernails, took a blood sample. Finally the doctor showed up and said, 'Well. What have we here?' He looked me over from stem to stern, from bark to core, and then told the nurse that my cough seemed to be improving after all. He prescribed two whites and a yellow and disappeared back to the card game, which was going on in the main operating theater.

"I could tell I was in real trouble. Finally, after I paid them $95.90, I put on all my clothes and ran out of there, and found a length of rusty baling wire right outside of the Obstetrics ward. I made a tourniquet out of it and limped home, where I was finally able to get the shin to stop bleeding.

"This morning I went back to the emergency ward and hung around outside, asking questions. There was a guy who had gone there to have a splinter removed and ended up with a vasectomy. An elderly lady with a sore foot was fitted with a hearing aid and sent home. A young guy was amazed to discover that he had been operated on for an ovarian cyst, and a middle-aged gentleman with a slipped disc had become an unwitting donor for a kidney transplant. If these people had been cured, boy, it was going to take them a long time to recover from it. I mean the ones going into the hospital were in better shape than the ones coming out, which made me wonder about doctors. I guess it must take a certain personality to be a doctor."

—Cook Neilson

Dr. Grabow
DUKE FILTER PIPES



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For FREE informative booklet, write Dr. Grabow Pre-Smoked Pipes, Box 21888, Greensboro, N.C. 27420

CIRCLE NO. 26 ON READER SERVICE PAGE.

AKRONT ALLOY RIMS
A Rim That Doesn't Ream Your Wallet

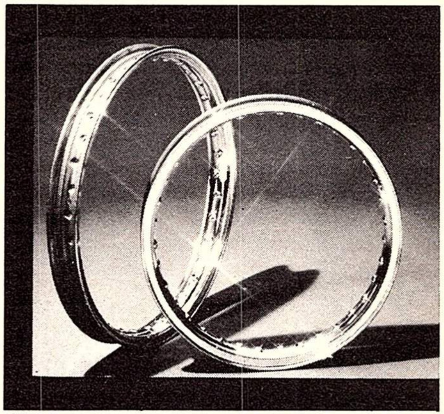
Winning may mean everything to you, but why spend more than is necessary for a rim that helps you win? After all, money's important, too.

For the most part, there are two rims on the market that are superior to any others for dirt riding conditions. Both offer virtually identical features. Like:

- Lightweight aluminum alloy construction
- No ridge to fill with mud
- Heat-treated for increased tensile and proof stress
- Deep knurling to prevent tire slippage
- Flash-butt welding for rigidity at weld points

All the important factors compare. Except the price. Akront Alloy Rims are priced from $22 to $36. Is it necessary to spend up to $50 for a rim with the same technology as Akront?

That's the question many pros, experienced dirt riders and accessory dealers are asking right now. We're sure there'll be some changes made.



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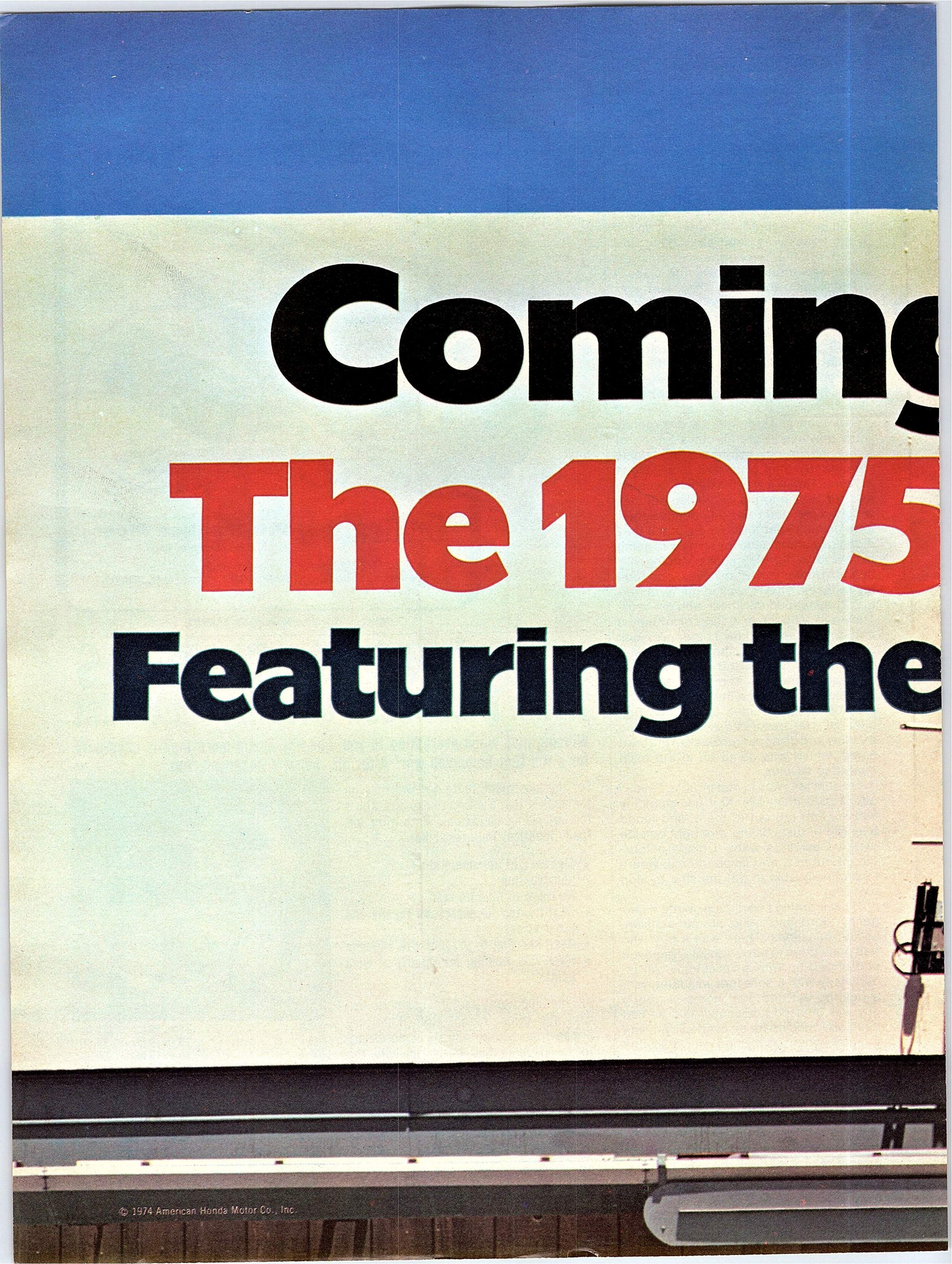

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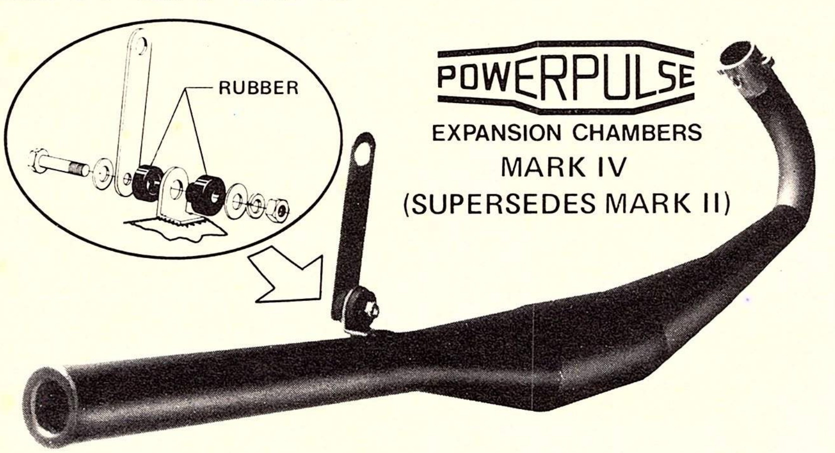

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PIPELINE *Continued from page 6*

the expense of getting there"—or his entry forms are thrown back.

When it comes to non-championship meetings, the reasoning is rather different. It runs thusly: discerning spectators will roll up in numbers only when the aces are racing, and aces will race only when they receive acceptable reward for their services, and the promoters will make profits only when spectators attend in large numbers to see the aces.

Nothing nearly so comprehensible controls the destiny of the TT, a law unto itself as though the racing world stopped turning in the mid-1960s. The TT generates traditionalism and nostalgia; it regurgitates every platitude and cliche in the book. "They don't build *real* racing machines nowadays," runs one line by the defenders of all things TT. "Only machines passing the test of real TT roads can qualify as genuine racers, and those other bloody things concocted in Japan for racing at Daytona: well, look, you can see what a pathetic load of old rubbish because they don't *handle* and their limitations are exposed by the TT roads and their pretentions as complete racers demolished by machines giving half the horsepower, and long live the Manx Norton, etcetera, etcetera."

Dogma: the truth is in the mind of the believer. It's correct to say that bikes conquering the insidiously unique TT bumps will emerge as winners elsewhere. Equally, machines carrying success statistics as long as your arm may slump at the TT. The TZ750 Yamahas, for example, failed dismally to come to terms with the TT. In fact, most TZ750 riders gave up the unequal struggle of keeping the front wheels in contact with the road, and fetched out 350 (or oversize) Yams for the "Open Formula 750 TT Classic." Imagine, if you are able, a 750cc race without a TZ750 in the top 30 finishers.

And the 500cc Grand Prix Suzuki fours had all the wrong answers. Despite being hurriedly re-equipped with new frames based on the 750 pattern, Suzuki handling remained *bad*. One former Suzuki factory rider was moved to remark: "Ten years ago they gave us 250cc square-fours with damn-awful handling. Today they build 500cc square-fours with the same damn-awful handling."

You will have noted, nonetheless, that Suzuki broke the factories' unwritten agreement to ignore the TT. Actually, Suzuki action was no show of dedication to the principle of developing complete racers through the TT examination, being rather more a response to the wishes of riders Jack Findlay and Paul Smart. And Suzuki involvement proved part-hearted when development boss Sigeyasu Kamiya left the island prematurely to overlord Suzuki testing at Mallory with the well known anti-TT rider, Barry Sheene.

After all Mallory "Post TT" opposition would include Read, Agostini, Lansivuori and Bonera, in a race of just *27 miles*. Clearly a case of relative values.

—Jim Greening

LETTERS

Continued from page 10

about NVT's future. Things can be bad for just so long, you know. Mr. Poore's efforts saved Norton. He'll probably make NVT a winner.

The German's revel in technical excellence. The Italians build beautiful machines. The Japanese make advanced and civilized bikes. America's Harley-Davidson makes Harley-Davidsons which are neither here nor there. And Great Britain produces what this writer believes are the true enthusiast machines. Their bikes may not sport all the conveniences of the Japanese, the style of the Italians, the quality of the Germans, or the sheer desireability of a Harley-Davidson but, they do handle superbly and most all they demand a certain amount of understanding and attention that an enthusiast will give willingly and others will not. It's all the difference in the world.

Robert Luther
No Address

BOOST OF ANTICIPATION

One summer when I was about ten years old, I was riding my bicycle back from swimming in the local river. A man in googles and a helmet, all wrapped up in leathers on a thundering two-wheeled machine blew down going into a corner and cranked up in a bellowing exit from it. At least that's the impression I carry of it. That image lurked in my mind when I bought my first unsuccessful basket case, egged me on when I finally got one into running shape, and has stood full in my mind on every occasion I've had to buy a motorcycle since.

This evening I went out for a nice easy ride. Just to taste the wind, the smells and the sounds. As I drew down on two boys with wet hair and towels slung over their shoulders, my first initiation into the adventure of cycling threw inself in my mind. So I put on a little speed, blew down and hurled myself only a little recklessly around the next curve. I doubt I produced quite the same formidable presence, but I still think I've just given a little boost of anticipation for the unexplored fun ahead to a couple of kids.

Everyone catches the bug in a different way and I hope we all do a little something to insure that those coming behind have the opportunity to catch the bug in their way. Not recklessly, but just enough to give a taste of the freedom.

Jim Huston
Mahwah, N.J.

CALIFORNIA SCREAMIN'

Oftimes this year past CYCLE magazine has almost raised me from the depths of lethargy long enough to post a letter of application to receive the rag on a monthly-mailed basis. Almost. Indignant ideas or tip-of-the-tongue praise was not enough to provoke the final causation resulting in a letter.

After a particularly stimulating indoctrination, such as Pull Starter's original thesis on rear shocks, it was more just to chug out to the ever willing Yammie and rip away at its innards. A year of this sort of activity has left me with a weird yet finally workable Japanese scooter, but no subscription.

All that is here-to-forward changed. G.J.'s "Epic Fork Extravaganza" was toooo much! I must be assured of a constant supply of your efforts. Odd as it may sound, my first reaction was to say "To hell with that cheap rip-off offer of a year for $3.99. Send those deserving chaps the entire bill, $9.00."

Thus ends the financial reason for this missive, and anything that follows can be dismissed as the rantings of a depraved soul. Read only when one of the staffers is in your office, cage, corner, whatever, asking for a raise. Then, with a legitimacy born of TRUTH, you may cooly state you have in your hands the unburdenings of a subscriber, to whom you owe more responsibility (i.e., time) than to a mere flunky.

December of '73 found me in a mood to seriously follow up my spasmodic requests to become a part of the number one team in cycledom today. San Diego was beckoning, snow was blowing here, my 360 was out of knobs and I had thought (shudder) of getting married. So, with a casualness befitting my lifestyle

(Continued on page 124)

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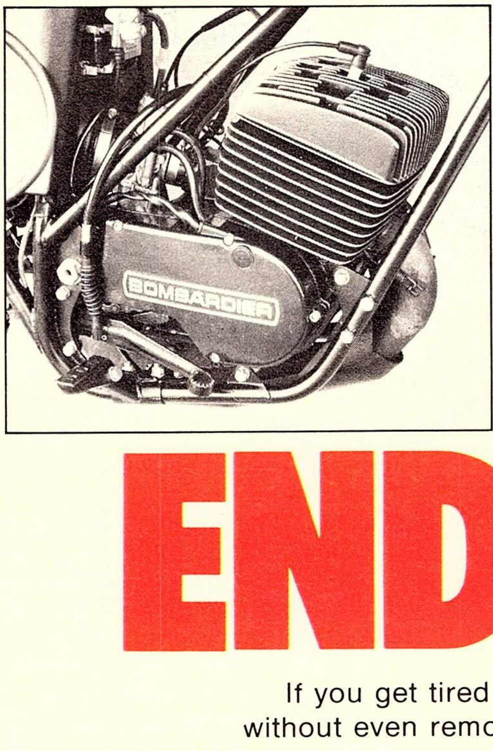
CAN-AM 250 T'NT ENDURO



If you get tired of trails, you can win a motocross without even removing the lights. If you tire of motocross you can win the stock 250 street class at the drag strip—knobby tires and all. After that you can do some cafe racing, and win your share again. If you get tired of riding, you can win some money instead. Just make a few bets with your friends about horsepower.

● The degree of proficiency attained determines the sophistication of the tools required. A housewife needs only an adding machine for balancing her checkbook, but a launch expert must have a complete computer to calculate rocket trajectories or balance differential equations. The Can-Am is the computer of off-road motorcycles. It's not for everyone, because its high powerband makes it harder to ride than a Yamaha Enduro. But the same powerband in the hands of a motorcycle launch expert makes the Can-Am the best enduro bike in the world, regardless of displacement.

The magnitude of such a statement is enormous considering the existence of Penton and Maico enduros, but *Cycle* is convinced the Can-Am is No. 1 (in spite of several shortcomings) simply because its performance numbers and other strong points are so overwhelming.

Can-Am's history is brief and impressive. It begins with Bombardier Ltd., a company headquartered in Valcourt, Quebec and founded in 1937 by Joseph-Armand Bombardier to build snow vehicles. Today, after rocketing into the economic stratosphere with the sale of more than 1 million Ski-Doo Snowmobiles since 1960, Bombardier controls 20 other concerns and markets motorcycles, snow vehicles, tractors, plastics, apparel and rubber goods in 32 countries through 4000 dealers. Sales last year totaled $156,000,000.

In 1970 the company determined that motorcycles would (1) provide needed diversification, (2) furnish a second major product line for some 2500 snowmobile dealers and (3) allow full utilization of assembly lines normally idle during the off-season. The Board of Directors hired an American, Gary Robison, to design and build a complete line of street and dirt motorcycles for Bombardier. Robison was a Californian who learned about motorcycles by tuning race bikes and grinding cams for Harmon & Collins. The Bombardier Directors gave him a white sheet of paper and unlimited funds and said, "report to us once a month on your progress. And by the way, add the profitability of the motorcycle division to your list of responsibilities."

Robison formed a design team (which presently numbers 65) in the motorcycle R & D department, and attributes Can-Am's success to his entire staff. Others in the company say it couldn't have happened without him.

One of Bombardier's major wholly-owned subsidiaries is Rotax, an Austrian engine-building firm with elaborate two-stroke production facilities. During 1971 Robison flew to Austria 15 times to super-

can-am

vise the design and testing of Can-Am's incredible rotary-valve engine. Most of the following year was spent on chassis work and prototype production. Late in 1973 Bombardier released four Can-Am motorcycles to the public—a 125 MX, 125 T'NT Enduro, 175 MX and 175 T'NT Enduro. All four bikes immediately proved their worth, but easily the most impressive competition achievement was Billy Uhl's tie with Carl Cranke (250 Penton) and Jack Penton (400 Penton) for the ISDT Qualifier series championship while riding a 175 Can-Am Enduro. He was also the only rider in the series to win a Gold Medal in all six events.

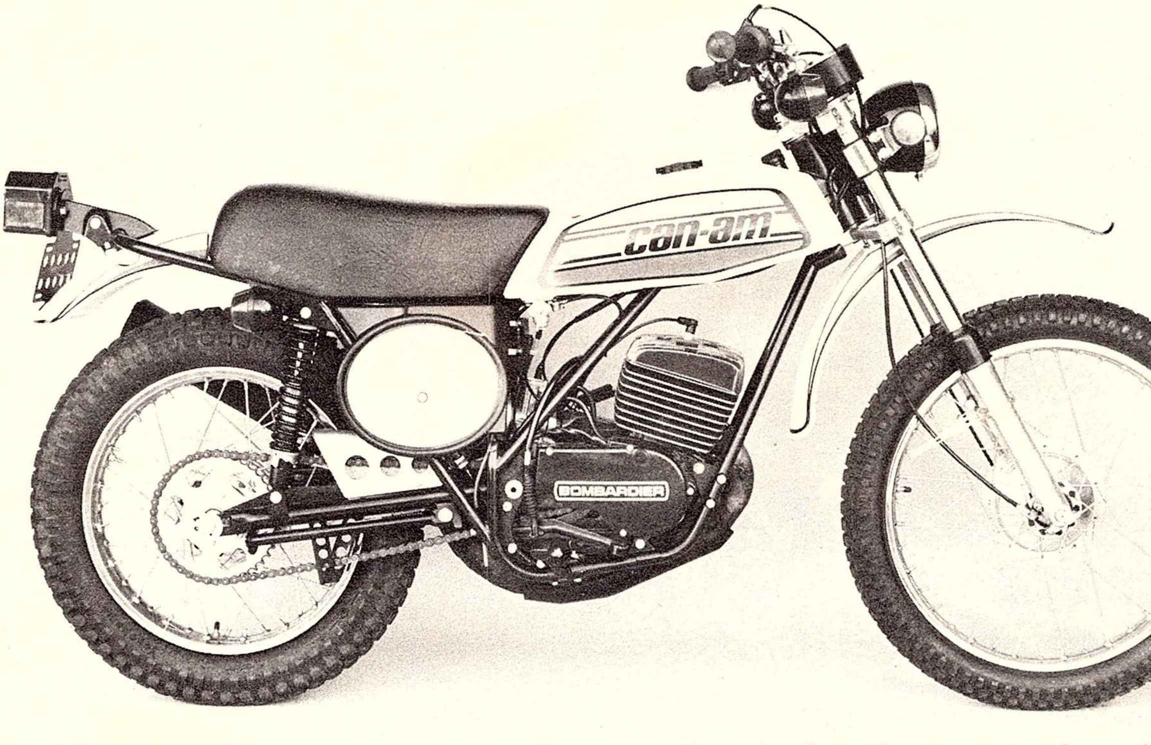
Similar feats of giant-killing were preordained for the 250 by its performance numbers. At Irwindale Raceway *Cycle's* Can-Am walloped every other 250 we have ever drag tested with a 15.040-second, 85.22-mph quarter-mile. Not even the Yamaha, Kawasaki or Suzuki street 250 Twins can threaten that figure. The enduro bike most similar to the Can-Am in concept and performance is Penton's 250, which ran 1.4 seconds and 9.02 mph slower.

On the dynamometer the Canadian bombshell exploded for 27.73 horsepower, an amount any manufacturer would be happy to find in their motocrossers and an amount which exceeded the Penton's best by 1.17 hp. During a flash reading in which the Can-Am was revved directly to its 8000 rpm power peak, output reached an astounding 30.03 hp.

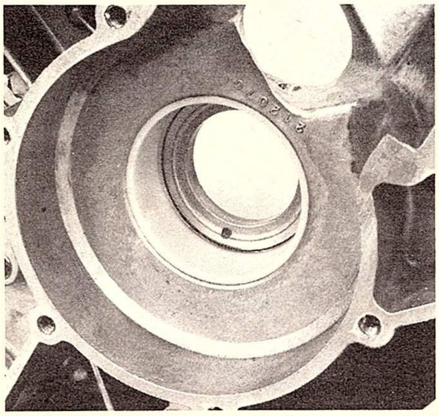
Out in the field these enormous performance figures suggest that the Can-Am should be able to set fast time in any Six Day special test section, and threaten even 400 Huskies in high-speed cross-country events such as Baja. There is enough mid-range power to bounce along at 24 mph in an enduro without constant shifting, but such high hp figures naturally steal torque from the low end. Since it's impossible to have both, Robison has opted for the screaming meemies. "Without a reputation or established dealer network to sell motorcycles, Can-Am must sell horsepower," says Robison. "Either you build it for serious riders or you build it for the Sunday cow-trailers. The Japanese have the Sunday bunch well-covered, so we build for the pro. A good rider can go faster with lots of horsepower than he can with lots of low end."

So seems to be the case in the real world. Pentons have even more radical power characteristics than the Can-Am, and of the 30 men who qualified for this year's ISDT, 14 rode Pentons—making them the cross-country bike to beat in America. When going fast really counts, America's top riders prefer the acceler-

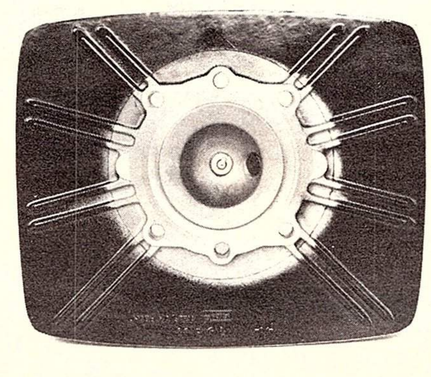
PHOTOGRAPHY: DALE BOLLER, BILL DELANEY



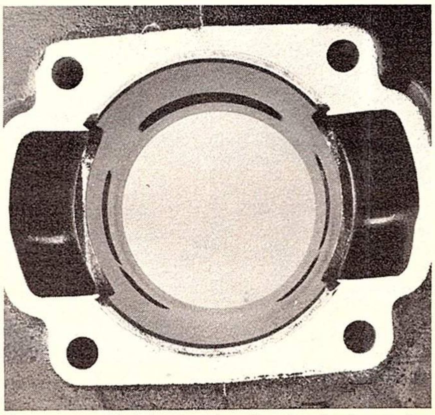
Bold tank striping and a stubby cylinder give the Can-Am a distinctive look. The number plate implies its purpose—enduros and ISDT qualifiers.



Coefficient of expansion of plastic insert equalizes expansion rates of bearing and case.



Symmetrical head requires a 30 thousandth squish band and features enormous finning.



Porting couldn't be simpler. Two bridged transfers and a huge exhaust accent the rotary valve.

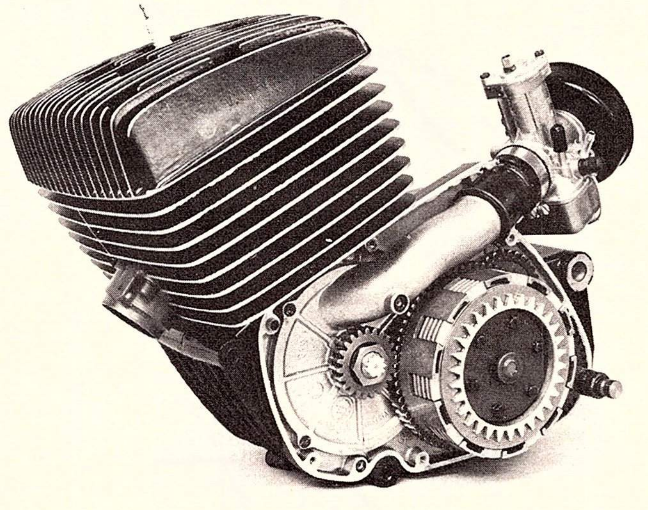
ation and top speeds provided by sheer horsepower. These riders, and several thousand others across the country, are skillful enough to maintain the ground speeds which keep a high-output engine in its powerband, to manipulate the throttle accurately enough to avoid wheelspin, and to shift as required in the midst of any kind of terrain. A novice may be intimidated by such demands, and more experienced riders simply may not like such power delivery characteristics. For them, and the novice, an Ossa or Yamaha with lots of bottom-end torque will be easire to ride, and therefore preferable. But for guys who can use it, raw horsepower is the quickest way down a trail.

The engine responsible for this power was built under ideal conditions: unfettered by previous design restrictions, existing production facilities or lean budgets. It benefited from all the mistakes in motorcycle engines before it. Enthusiasts designed it. It took shape on a drawing board with space-age technology and materials at its disposal.

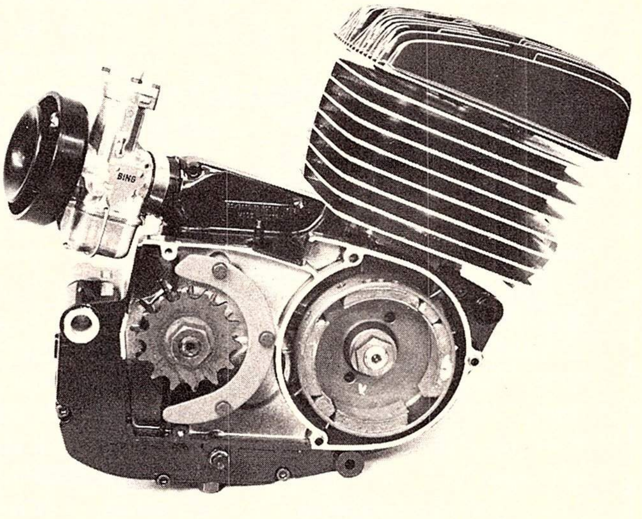
But ideal circumstances don't make horsepower. Metallurgy, rod-length-to-stroke ratio, port timing, quality control and other basics do. Bombardier uses radically over-square bore and stroke (74 x 57.5mm) dimensions along with hot port timing and a large chunk out of the rotary valve to achieve power. The cylinder and head on the enduro is the same as the motocrosser, yet it idles without a fuss and persists in starting on the first kick. Porting consists of two bridged transfers, a huge exhaust and an egg-shaped intake port opened and closed by a thin steel rotary valve geared to the crankshaft. The holes in Bombardier's steel liner match the ports in the beautifully die-cast cylinder exactly. Our only complaint is that four cylinder studs have to be removed to get the cylinder off while the engine is in the frame.

Massive finning on both the head and cylinder dissipate heat fast. Even at peak horsepower on the dyno, temperatures hovered at the safe 400-degree level. Once while prerunning the Baja 500 course in Mexico, mud covered the engine; it still didn't ping or detonate from over-heating. In addition the engine refused to cough or lose power at altitudes from sea level to 5000 feet even while running on oily low-test Mexican gas.

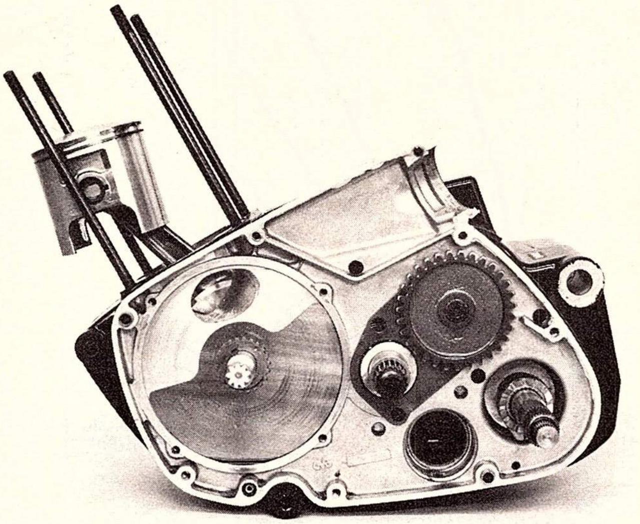
Inside the engine, a Dykes top ring and standard second ring for oil control encircle a cast aluminum piston. The rod carries needle bearings top and bottom. Nothing reflects the Can-Am's space age genesis more than the special plastic liners which support the huge ball bearing mains. The coefficient of expansion of the plastic is equal to the difference in expan-



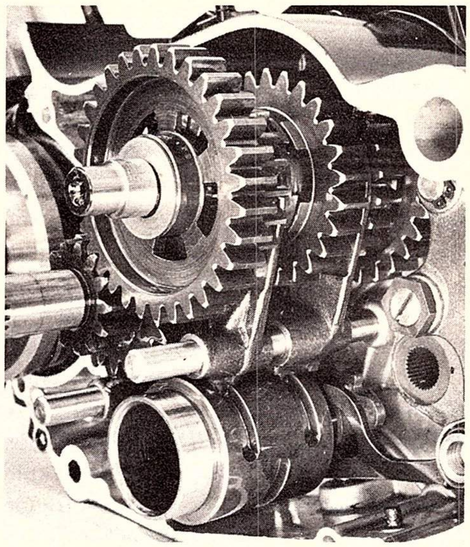
Unique ram tube locates the carburetor rearward for less engine width and contributes greatly to superior breathing. The rugged clutch runs wet.



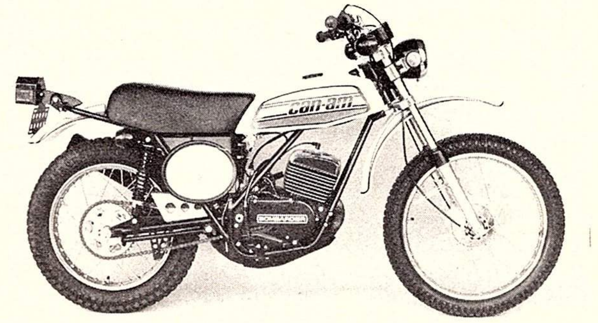
A bell-shaped velocity stack is moulded into the carburetor air box boot. Three different chain shrouds are available to match different sprockets.



Removing the ram tube reveals a giant rotary valve and the intake port. Removeable bearing retainer plate on transmission shafts eases shimming.

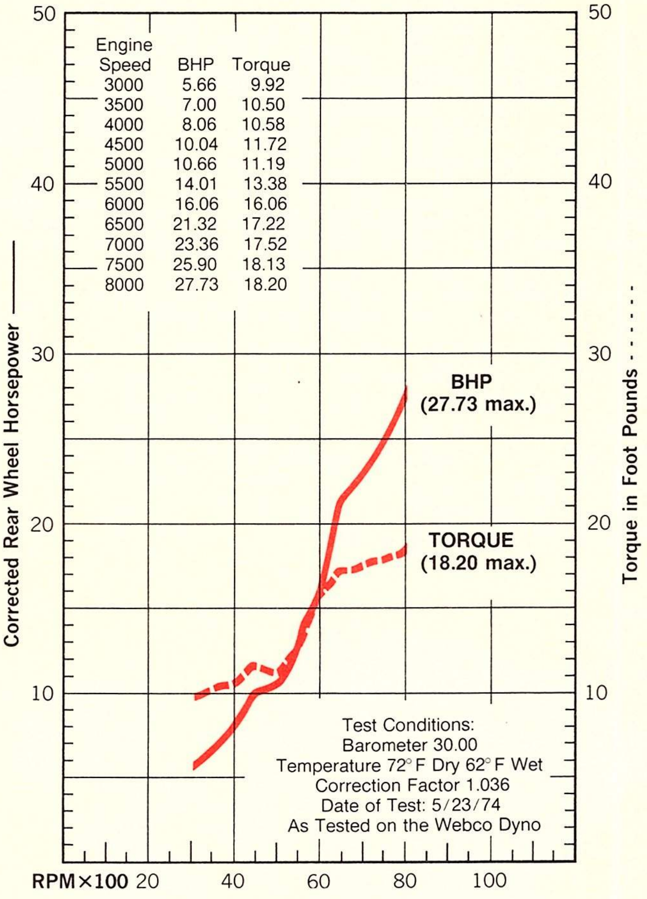


Drum and fork mechanism provides faultless shifting. Idler gears spin on needles, shafts on balls.



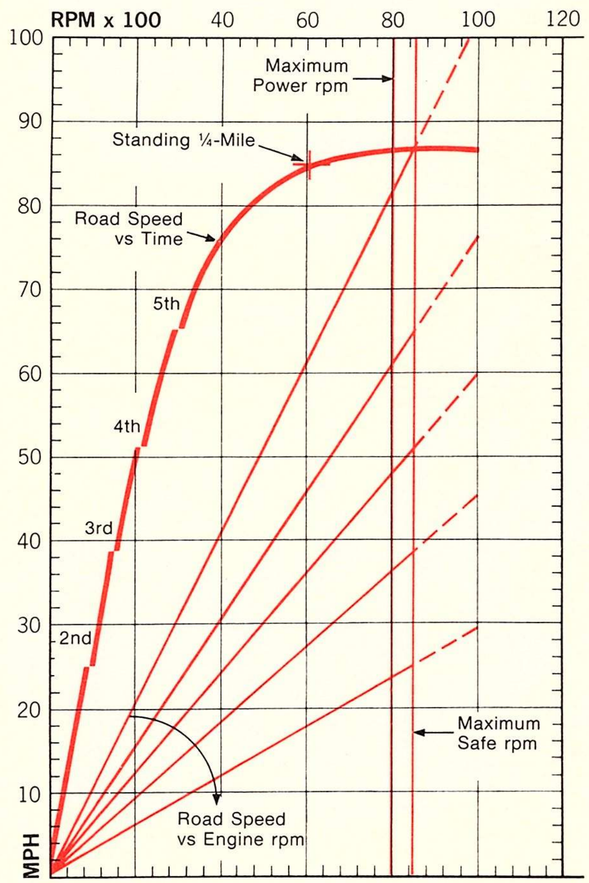
250 CAN-AM T'NT ENDURO

Price, suggested retail	$1465
Tire, front	3.00 x 21 Yokohama Trials
rear	4.00 x 18 Yokohama Trials
Brake, front	5.90 x 1 in. (150 x 25.4 mm)
rear	5.90 x 1 in. (150 x 25.4 mm)
Brake swept area	37 sq. in. (239 sq. cm)
Specific brake loading	11:5 lbs./sq. in. at test weight
Engine type	Two-stroke rotary-valve single
Bore and stroke	2.91 x 2.26 in. (74 x 57.5 mm)
Piston displacement	247cc
Compression ratio	13:1
Carburetion	1; 32mm; Bing
Air filtration	Filtron foam
Ignition	Bosch CDI
Bhp @ rpm	27.73 @ 8000; actual
Torque @ rpm	18.20 @ 8000; actual
Rake/Trail	Adjustable: 25°-32°/4-6 in.
Mph/1000 rpm, top gear	9.7 mph
Fuel capacity	2.5 gal. (9.5 liter)
Oil capacity	2 qts. (1.89 liter)
Transmission oil capacity	1.2 qt. (1.14 liter)
Electrical power	55 watts @ 6000 rpm
Battery	12V, 5AH
Gear ratios, overall	(1) 25.4 (2) 16.24 (3) 12.13 (4) 9.56 (5) 7.99
Primary transmission	Spur gear 2.91:1
Secondary transmission	⅝ x ¼ Renold chain 14/42 3:1
Wheelbase	55 in. (140 cm)
Seat height	31 in. (50 cm)
Ground clearance	6 in. (9.65 cm)
Curb weight	267 lbs. (12 kg), with full tank of gas
Test weight	427 lbs. (194 kg)
Instruments	Seiko speedo, odo, trip mileage 2-way by 10ths
Sound level (California Standard)	90 dB(A)
Standing start ¼-mile	15.040 sec.; 85.22 mph
Top speed	85.22 mph (137 kph)
Average fuel consumption	25-30 mpg
Speedometer error	30 mph actual 29.85 60 mph actual 62.89



Engine Speed	BHP	Torque
3000	5.66	9.92
3500	7.00	10.50
4000	8.06	10.58
4500	10.04	11.72
5000	10.66	11.19
5500	14.01	13.38
6000	16.06	16.06
6500	21.32	17.22
7000	23.36	17.52
7500	25.90	18.13
8000	27.73	18.20

Test Conditions:
Barometer 30.00
Temperature 72° F Dry 62° F Wet
Correction Factor 1.036
Date of Test: 5/23/74
As Tested on the Webco Dyno

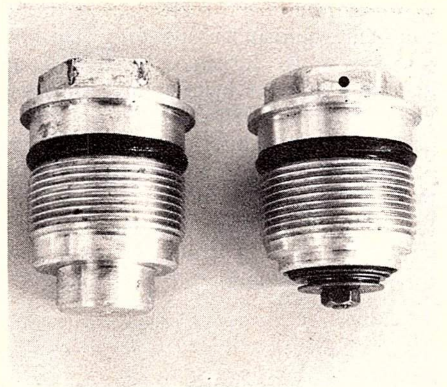


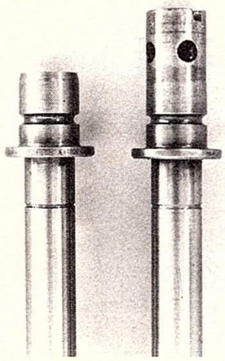
sion rates of the aluminum crankcase and steel bearing race. Thus the bearing/crankcase fit is uniform hot or cold, and there is no crankshaft whip to accelerate wear or promote excessive vibration.

No component is more critical than the clutch in controlling high-horsepower engines in tricky traction situations. It must be able to supply partial amounts of power smoothly while the engine spins at six or seven thousand rpm. Such slippage can warp and swell a flimsy clutch in seconds, but the Can-Am plates handle teriffic abuse without losing their wide engagement point and progressive action. Twelve alternate steel and friction plates are held tight in an oil bath by six springs controlled by a nylon-lined cable. Straight-cut teeth on the clutch hub mesh with the crankshaft gear to form the primary drive. Pull in the clutch and the bike will start in any gear.

Early 125 and 175 Can-Ams had problems with stiff shifting and elusive neutrals, but the 250's rotary drum and fork arrangement works perfectly with or without the clutch. All five transmission ratios are well spaced for fast cross-country riding.

Mikuni supplies an oil injection pump driven by a nylon gear on the crankshaft end. The pump lives in a sealed compartment in the primary cover, which butts against O-ring-sealed oil galleries cast into the intake ram tube and lower crankcase. From this lower gallery oil flows into the main bearings and out through the drilled flywheel to the big-end needles.


Can-Am 250's top fork nut permits air to escape on compression so no hydraulic air lock can occur.


Can-Am piston rod (right) directs oil onto side of stanchion rather than up and onto fork springs.

Bombardier has developed a sticky green injection oil which seems to be everything a good oil should be. Besides minimal smoking and consumption, the oil burns so clean that after 800 miles no carbon had collected around the exhaust port and only a thin carbon skin coated the piston crown. Both rings were completely free. Once the two-quart oil tank is full, you won't have to worry about replenishment for at least 600 miles. A pinhole leak in the oil tank of *Cycle's* test bike remained undetected until injectolube spread all over the battery box and ignition system. Apparently the flaw was so small that Bombardier's routine pressure check didn't detect it. A spot of epoxy stopped the dribble.

Germany supplies carburetion to Bombardier in the form of a 32mm Bing, which remains accurate in all types of terrain. Part of the tuned intake system includes a rubber velocity stack molded into the boot connecting the carburetor and air box. Fiber mesh traps water and large objects at the air intake under the seat; a small Filtron handles the final cleaning. For dusty competition, a larger air cleaner would be desireable because our Filtron was almost totally clogged after half a day

Once you change to knobbies the Can-Am will perform every dirt trick in the book. Slides are easiest with steering head eccentrics at 32 degrees.

in this year's Greenhorn Enduro.

A second major engine component from Germany is the Bosch electronic ignition. Magnetic pick-ups in the alternator trigger a magic box and coil located under the tank/seat junction; there are no points. Timing should never slip, but if it does, a strobe light and screwdriver can get it back to spec in 5 minutes. The alternator also charges the battery, which drives all the accoutrements of street legality.

Bombardier has two problems with the Can-Am engine in its 250cc form. The low pipe has to go. It reduces ground clearance to a paltry 6 inches, and requires a heavy skid plate which gets gouged and gashed in the first rocky section you encounter. It must be removed to drain the transmission oil. It prevents you from propping up the bike on a flat surface to adjust the chain or remove a wheel. The smaller Can-Ams have high pipes; why not the 250? Gary Robison says a high pipe steals too much area from the air box, looks bad and produces about one horsepower less than the low one. Still, nine out of ten enduro riders would take the high version if given the choice.

Suspension gives you enough confidence to leap chasms without fear of compressing your back.

Another problem less easily remedied is engine vibration at high rpm. Up to 5500 revs the Can-Am is smooth, but it buzzes progressively worse as greater power outputs are reached. At peak revs vibration intrudes on the rider's concentration and begins to shake things off. While prerunning Baja with some fast characters on bigger bikes, our Can-Am spent several hours in the upper reaches of its rev range. The left turnsignal fractured and fell off. The horn bracket broke. The steering head cap nut disappeared. The ignition switch tumbler shook loose. The taillight lens was lost. The cross piece on the handlebars cracked. A bolt from the taillight bracket turned up missing, and the rear muffler mount fractured. Robison is aware of the vibration and is at work on a cure. In the meantime a few of the more vulnerable plastic pieces are being reinforced, along with the horn and muffler bracket. Luckily most of the fasteners on the bike are top-quality self-locking nylon-lined nuts, which successfully resist the shakes.

A powerful motor is only part of going fast. Can-Am's handling contributes as much to its overall excellence as its horsepower. The exclusive adjustable rake system employs three sets of eccentrics which drop into the top and bottom of the steering head in 49 combinations to provide a fork-stem rake of 25 to 32 degrees. Torrington needle bearings support the fork stem inside each eccentric. Changing the eccentrics, and thus the rake and trail, takes about half an hour. Thus you can tailor the bike's steering characteristics to your pleasure—if you have the sensitivity to tell the difference between half-a-degree one way or the other. As delivered the Can-Am has 30 degrees of rake and just over 5 inches of trail, a combination that gives it excellent steering. If you intend to experiment with forward-mount shocks, the eccentrics will enable you to change the front end proportionately.

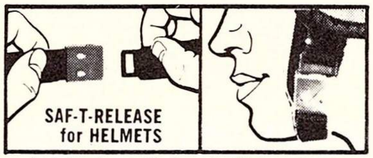
Other specifics included in the geometry category are 55-inches of wheelbase, a swing arm about an inch longer than average, a low center of gravity and weight distribution more heavily biased towards the front than most bikes. With a rider aboard, however, bias returns to a more average percentage. The extra front-end weight minimizes unwanted wheelies and helps maintain a more horizontal attitude on long jumps. The double-loop cradle frame is made of high tensile steel and features a large backbone tube which doubles as the oil injection reservoir.

Suspension joins accurate geometry as a co-partner in the off-road handling mix. After extensive testing of various brands, Bombardier selected S & W shocks with

(Continued on page 102)

ACCESSORIES

for everybody...



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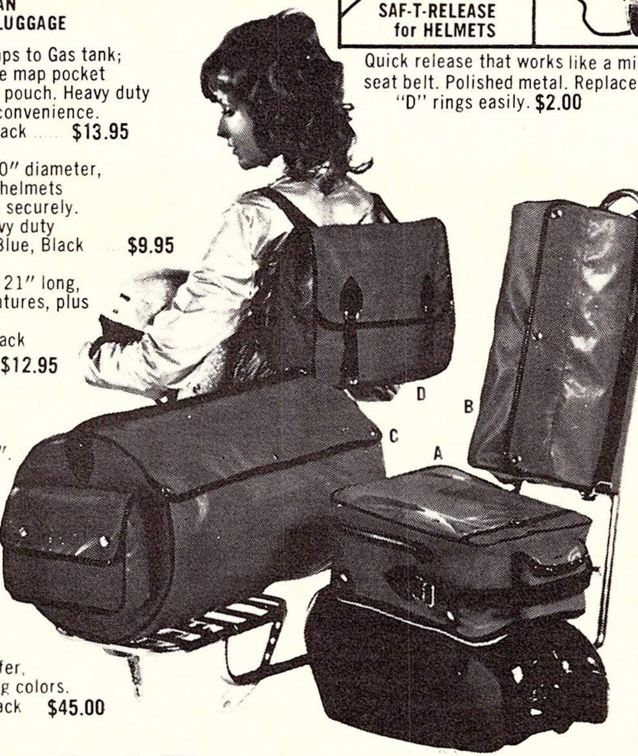

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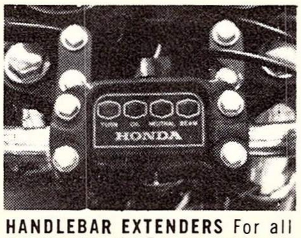

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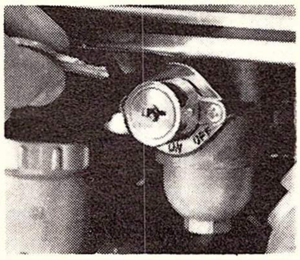

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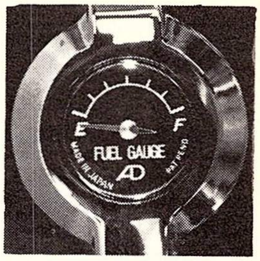

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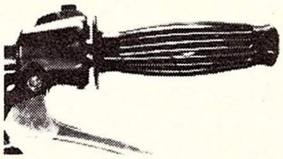

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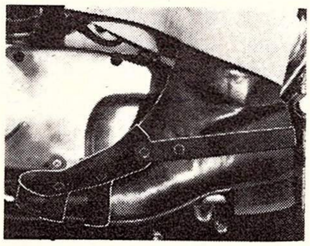

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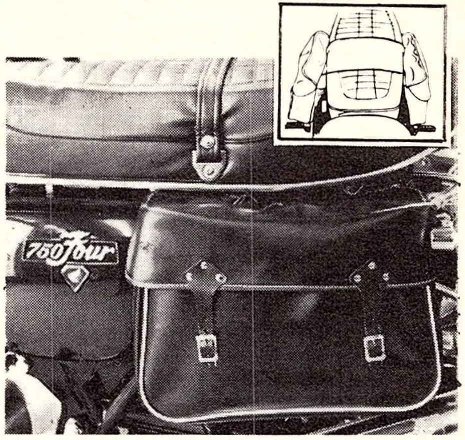

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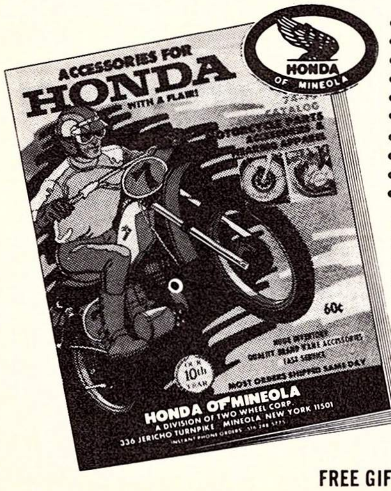
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Basics

INSTRUMENTS

By Gordon Jennings

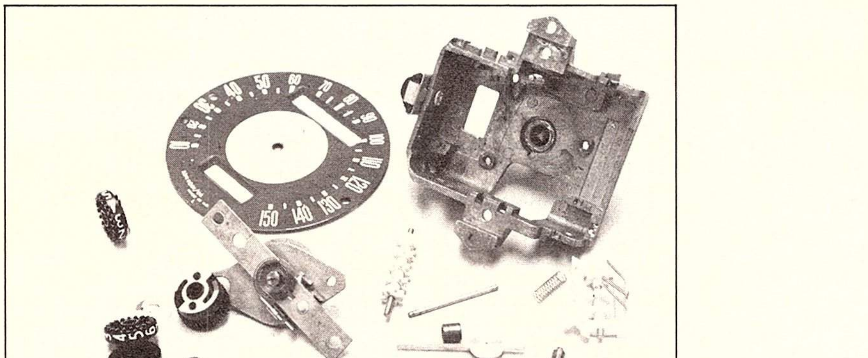
● Motorcycling has its genuine artists: gifted men who can squeeze a tire, touch a crankcase, listen to the whisper and jangle of moving parts, and simply *sense* many of the mechanism's vital signs: riders who can feel the wind, watch the pavement blurring underneath, and just *know* their speed. But real artistry is rare, and at its best still is subjective, imprecise. How hot is hot; how fast is fast? We often need that kind of information expressed in hard numbers, and for numbers we must turn to that category of devices called instrument—and make sure that they actually are more trustworthy than our fallible human senses.

One instrument common to all touring motorcycles is the speedometer, which in most instances cannot be trusted at all. Our regular road test procedure includes a check for speedometer error, of which there usually is plenty even when everything else is lacking. People who ride at the current energy-crisis speed limit often are heard to complain that everyone else is charging past at least 10 mph over the legal maximum. Maybe, but not likely, when you consider that the average motorcycle speedometer is about 4-mph optimistic at an indicated 60 mph. So, when your bike's speedo needle is trembling right at the legal mark you're probably thudding along at no more than 51 mph and that's one reason why others on the road seem to be such outrageous scofflaws. Make further adjustments for the typical driver's habit of bending the speed regulations right to their elastic limits, toss in the psychological enhancement of the speed of any object whizzing past one's elbow, and you have a good explanation for the law-abiding riders' complaints.

Heaven forbid we should lead people to sin against the law; we must warn the reader that he must not arbitrarily add four or five mph to his bike's indicated speed, assuming that true speed would then be at the legal maximum. A few motorcycles (particularly those from England) do have accurate speedometers, and it is best that you do not learn from your local friendly police that your bike is one of the few. You can save yourself the embarrassment, and the fine, by checking the instrument's accuracy. All you need is a stopwatch and a stretch of road with mile-markers.

Here's the speedo-check procedure: you time yourself between mile markers while holding a steady indicated speed; then divide the time, in seconds, into 3600 to get your true speed in miles per hour. You should repeat this procedure at perhaps three different speeds. Speedometer error usually is a fairly constant percentage of indicated speed, but isn't in every instance. Above all, *do not* try to use your bike's odometer as a substitute for the measured distances, because the average odometer, no less than the speedo itself, definitely speaks with forked tongue.

Why all the speedometer and odometer error? We're not sure, because both are marvels of simplicity and should not require super-precise manufacturing to provide reliability. The speedo's cable drives a circular magnet inside the instrument and the spinning of the magnet produces an eddy-current drag on an enveloping aluminum drum. The drum is prevented from turning freely with the magnet by a spiral-wound counterbalance spring. A shaft extending out through the instrument face carries the speedometer needle, which assumes a position of equilibrium between the torque induced by the spinning magnet and the counterbalancing influence of the spiral spring to give a reading in miles per hour. Manufacturing tolerances obviously will introduce some variations in the strengths of individual magnets and springs, and these factors would account for some instrument error. However, the errors we find are too consistently in favor of motorcycle makers' performance claims to be entirely honest



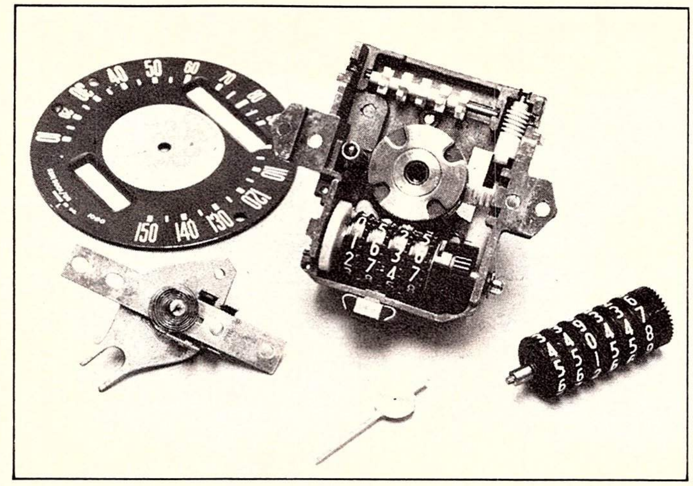
PHOTOGRAPHY: DAVE HOLEMAN

mistakes. If speedometers can be made to a nearly-constant 4-mph "fudge factor" then it should be possible to at least close the gap slightly between indicated and true speed.

There is even less justification for the odometer errors we have found. The odometer is totally gear driven, and will respond to the number of turns of the wheel to which it is linked with absolute fidelity. When the "tenths" drum in the odometer makes a complete revolution it trips the adjacent numbered drum one notch, then when the latter has moved around ten notches it trips the next drum a notch—and so on. Accuracy depends on providing gearing appropriate to the rolling circumference of the speedo-driving wheel. Differences in tire inflation pressure can produce small errors in odometer readings, but here again we have mistakes consistently in favor of the manufacturers' claims: an odometer that errs 10-percent higher than the miles actually covered will encourage the owner to believe he's getting fuel economy and distance between tuneups 10-percent better than really is the case. You can check for odometer error using those same mile markers you need for the speedometer, and you probably will have to revise some of those mileage figures you've been bragging about. If the error is 5-percent or less you can lay it to a little honest sloppiness; more, and it's probably flim-flam.

Viewed from the standpoint of law, tachometer error is much less important than those little white lies told by your bike's speedometer, and most nonracing motorcycles very likely do not need a tach at all. But if you're dealing with an engine that's sensitive to over-revving and/or has a narrow power band, the tachometer is a vitally important instrument. Don't worry about full-range accuracy, as that probably is unattainable; the important thing is that the tach should give precise information when the engine is at its redline, and even that may be beyond the instrument's capabilities. The tachometer's main problem is that it tends to lag behind rising engine speed when a bike is accelerating rapidly in first and second gears. This lag seems to be inherent in the mechanically driven tach, which is identical internally with the speedometer, due to the inertia of its aluminum drum and attached needle.

There's nothing you can do about tachometer lag, apart from showing restraint in your style of riding; it is possible to cope with error. A few shops around the country specialize in speedometer and tachometer calibration, but they may find themselves stymied by the rather odd tach drive ratios employed in Japanese-made motorcycles. Besides, professional calibration work is expensive and hairline accuracy isn't necessary except in the tachometers used on racing bikes (where it can make the difference between winning and breaking an engine). All the sporting street rider needs to know (if only to satisfy his curiosity) is the relative accuracy of his bike's tach, and we have a no-expense method whereby he may accomplish that much.

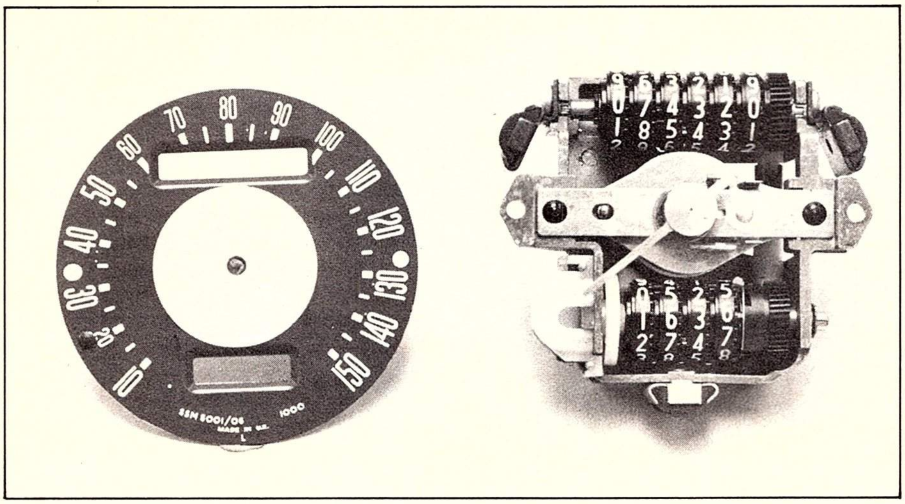


To check your bike's tachometer for truthfulness you need to know its overall gear ratios and the amount of speedometer error present. The method involves calculating what the tach reading should be at some true road speed and then checking to see if the instrument agrees. You begin by finding the rear wheel's rolling circumference. Sit on the bike, to load the tire, and get a friend to make chalk marks on the tire and the road. Then roll the bike ahead until its rear wheel has made one turn and the chalk reference line is again down against the pavement. Measure between the starting point and the new position of your reference line to get the number of feet your bike travels for each rear wheel revolution, a figure you must divide into 5280 to arrive at the number of wheel revolutions per mile. Multiply wheel revs/mile by the overall gear ratio and you have engine revs/mile, which is then multiplied by the bike's true speed—expressed in miles per minute—to obtain engine speed in rpm.

Let's apply The Method to a hypothetical motorcycle: we make the marks on tire and pavement, measure between them, and find that the bike moves ahead 78-inches, or 6.5-feet, for each wheel revolution. We then divide the 6.5-feet into 5280 (number of feet in a mile) and come up with 812 wheel revs/mile. Assuming that the overall gear ratio is 5:1, we would then multiply 812 by 5.0 and get 4060 engine revs/mile. The easiest testing speed is a true 60 mph, because that's exactly one mile per minute and at that speed our hypothetical bike's tach should be reading 4060 rpm. We know from experience that calculated engine speed is extremely accurate when done carefully, so if your bike's tachometer doesn't agree with your calculations do not be too quick to assume the difference is a matter of arithmetic mistakes. Chances are the error is in the tach and not in the numbers.

Industrial and some aircraft tachometers bear added resemblance to speedometers in having what amounts to an odometer, only with numbers reflecting engine-hours instead of miles. In fact, the gauge will be marked "engine hours" but what it tells you is not service time; it's the total number of revolutions turned by the engine. This system has shortcomings, as the figure on the instrument face does not take into accounting factors such as load, or the rate at which the crank turns were accumulated. Still, it is better than mileage as a standard of service intervals. Engine-hour recording tachometers are not available for motorcycles but you probably could convert a speedometer/odometer to serve the purpose. We're not entirely sure what purpose that might serve; it would be fun to try, and you might discover that fuel consumption, for example, relates more closely to "engine hours" than to miles traveled.

Neither speedometers, tachometers nor their drives are likely to give trouble. Back when the reduction gearing was in add-on housings there were some problems, especially when people tried to shoot grease into them with a high-pressure lube gun and discovered that the seals and gaskets (and sometimes the housing itself) were not strong enough to hold the load. But now that tach drives have become built-in engine components, and speedo drives gears commonly are part of motorcycle's front wheel hub assemblies (sharing the same supply of lubricant), failures are extremely rare. Indeed, the only problems most people experience are those they bring on themselves, and these usually arise from a severe kinking of the instrument drive cable. We've witnessed speedo and tach drive cables routed so they were certain to get pinched between the lower fork bridge and the steering stop, and seen then where they had to get kinked if the forks compressed even halfway. These drive cables also get used as lifting straps by people trying to pull their bikes out of mud holes, and cables are snagged on everything from tree branches to spectators. All of these things pull kinks into the cables and their sheaths, and that's very nearly the cause of cable failure.



When a cable has been kinked the best thing you can do is to replace it, but if the new part isn't available or you're short of money a repair is possible. The job requires that you remove the cable from its sheath and then make separate fixes. The cable, when kinked, must be pulled straight and the damaged section silver-soldered into a solid bar—which may then be filed or hammered until it has the same shape and diameter as the rest of the cable, albeit a little stiffer. The cable sheath can be coaxed straight, but the plastic covering that makes it water- and dust-proof will keep you from using heat. If all else fails you can force a short length of steel or copper tubing over the kinked spot to hold it straight, and if for any reason you have repeated problems with kinking try winding spring wire over the sheath ferrules and the first couple of inches of sheath—which is where most of the kinks develop.

We could avoid *all* difficulties with tach/speedo drive cables if electrical instruments could be made a practical proposition. There are non-mechanical instruments of this sort that provide extremely accurate readings, but the good ones seem to be horrendously expensive. Certainly the electronic tachometers of the type used on some 750 Ducatis, for instance, leave much to be desired. They waver and waggle, and when not doing that alternate between fits of sulkiness and moments of sly whimsy. We can't claim experience with all electronic tachometers; the ones we've tried have not been very good. The electrically-driven tachs used in tuneup work and the like do work fairly well. Maybe it's all the vibration and jolting of operation on a motorcycle that makes them misbehave.

It may be significant that the electronic tachometers with 90-degree needle-travel have the best reputation for accuracy, and it strikes us that the reason is they can't be read closely enough for anyone to know when they're wrong. The mechanical tachs usually have needles that sweep an arc of about 270-degrees, within a face diameter averaging something near 3 inches. Cut an arc like that into 1000-rpm or 10-mph increments and the readings don't become too badly crowded even when 12,000 rpm and 120 mph maxima are provided. Do the same on a 90-degree arc, compressing the markings by a factor of three, and you really can't tell what the instrument is trying to say unless you get your nose against the glass.

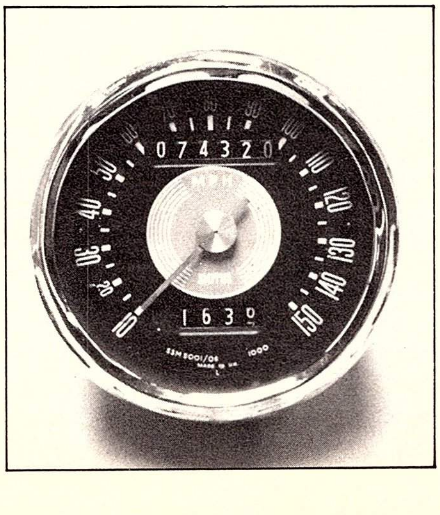
An important fact to consider relative to reading instruments is that when you're out in the real world of turns and traffic you don't actually read them at all. There may be times, tootling along an Interstate highway, that allow a long, studied glance at the tach and speedo; but the occasions upon which the tachometer, especially, should be watched sharply are those requiring maximum attention to the road. Racing provides an extreme example of this conflict of interests: riders have to watch the track, or crash; they have to watch the tach, or risk breaking an engine. And racing provides an answer: racers turn the tachometer so that when the critical number is reached, the needle is pointing straight up. Do that, and you don't even need numbers on the dial.

Now that the development of light-emitting diodes has brought direct digital readouts to everything from computers to alarm clocks, some one of the motorcycle manufacturers is sure to come up with the stunning idea of digital speedos and tachometers. These will be dazzlers in advertising copy and in the dealers' showrooms; they aren't going to work worth a hoot. Why? Because most of the instrument reading you do when you're riding is a quick scan and most people can scan-read the position of a needle much faster than their vision can register numbers. Also, you can watch the swing of an indicator needle and anticipate when a critical reading will be reached, which is very difficult with digital displays.

Warning lights usually are not considered instruments. They are, and their yes-no, some-none readings provide all the information many people require. The warning lights' problem is that they may not be bright enough to give an adequate warning at mid-day, and that they do not tell you trouble is coming—only that it has arrived. We are inclined to believe that a simple warning light is all the instrumentation the modern motorcycle's electrical system needs. Today's alternators, etc., are extremely reliable and when something does go wrong the flickering of a charge indicator light will tell you as much as a flickering ammeter needle. On the other hand, it sometimes is very important to monitor such things as oil temperature and pressure—which at their critical highs and lows respectively are warnings of impending engine damage.

Oil pressure is less important than oil temperature in most motorcycle engines, and vastly more difficult to measure. A simple pressure switch and warning light system is perfectly appropriate when the engine in question has a roller-bearing

(Continued on page 93)



Welcome the unexpected

If mountain trails were perfectly smooth and you knew every curve like the back of your hand, trail riding wouldn't be much fun, would it?

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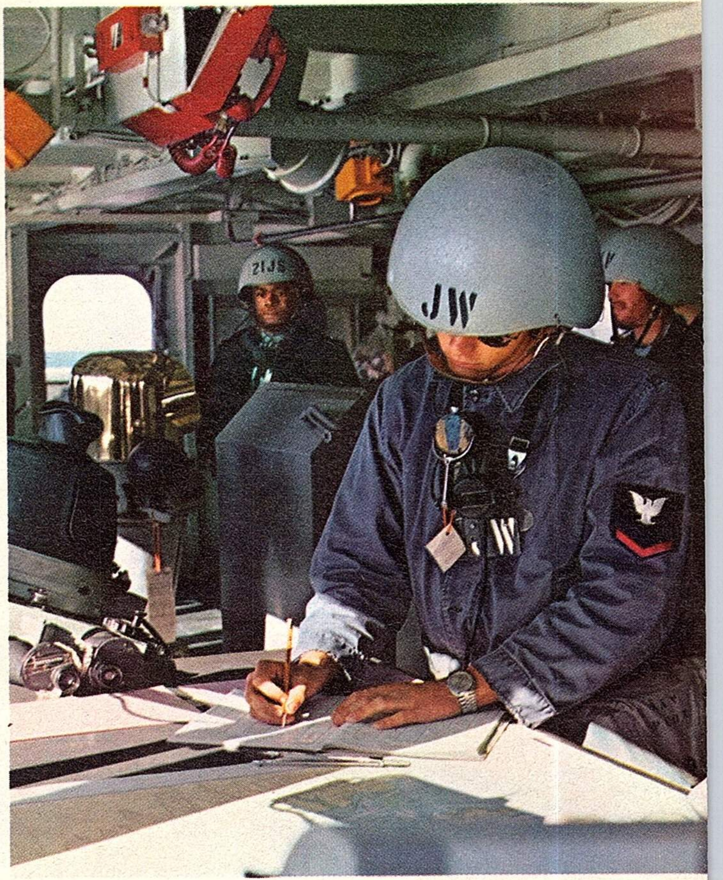

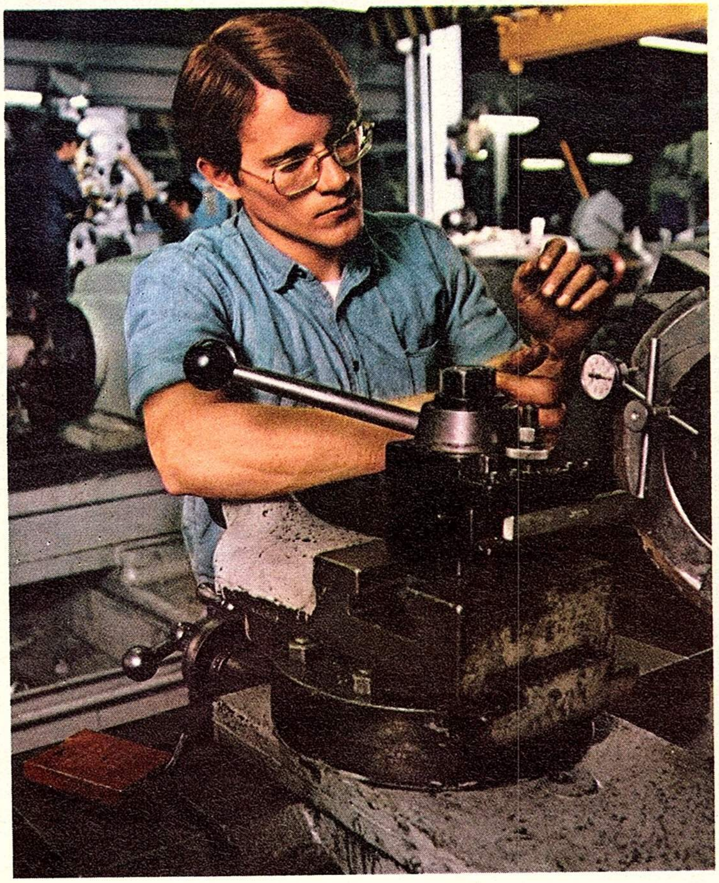

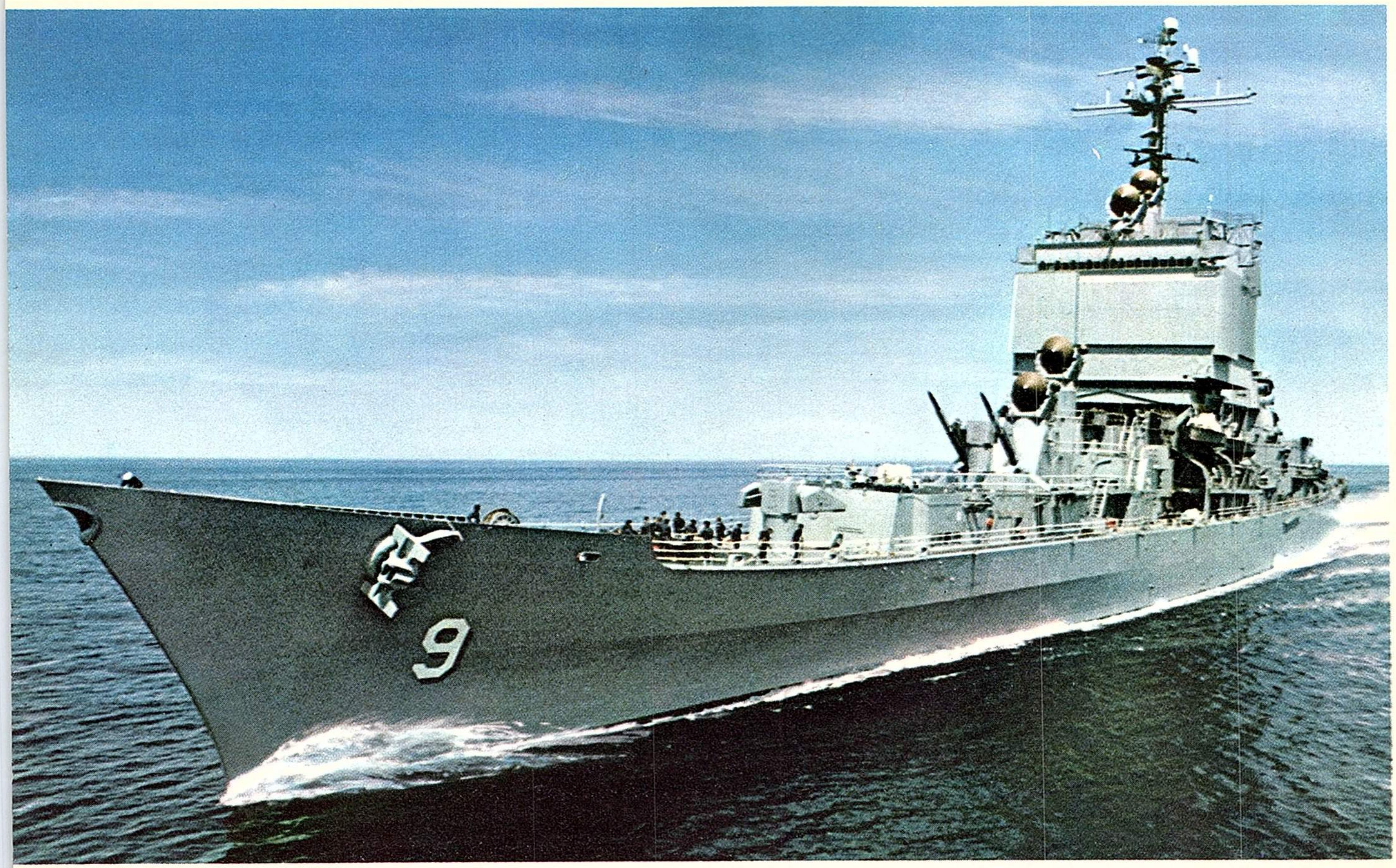

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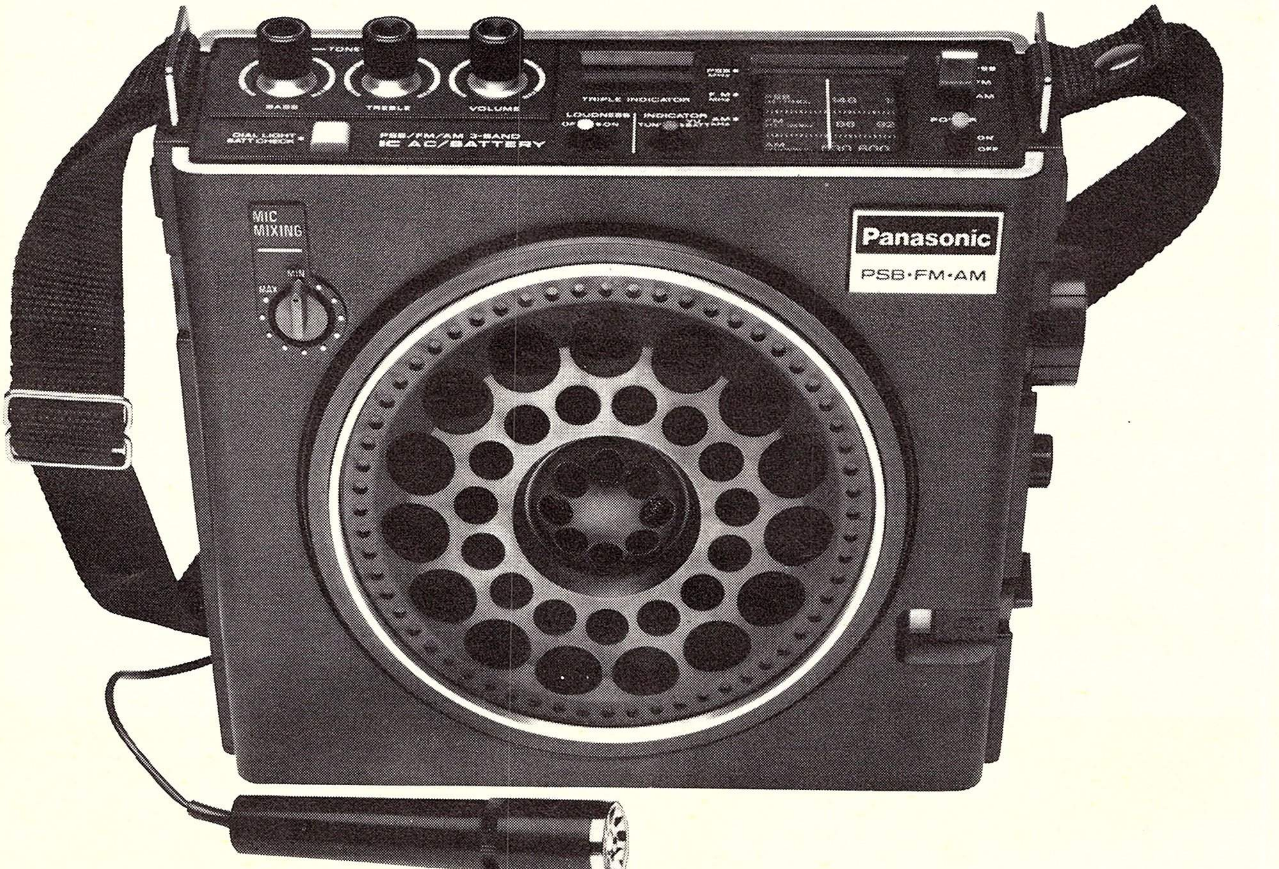

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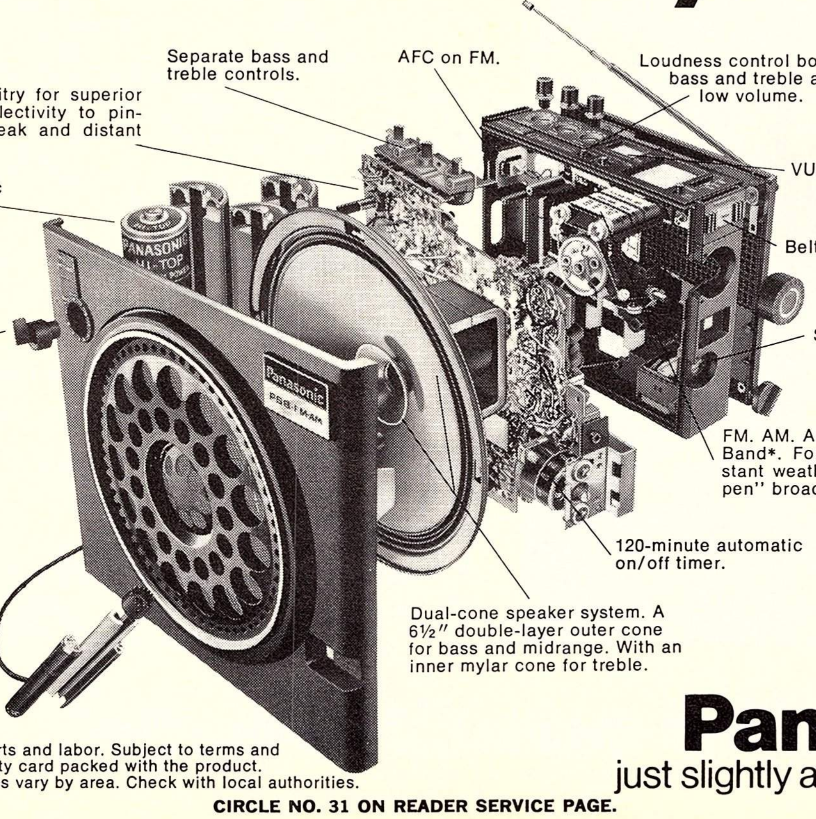

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CIRCLE NO. 31 ON READER SERVICE PAGE.

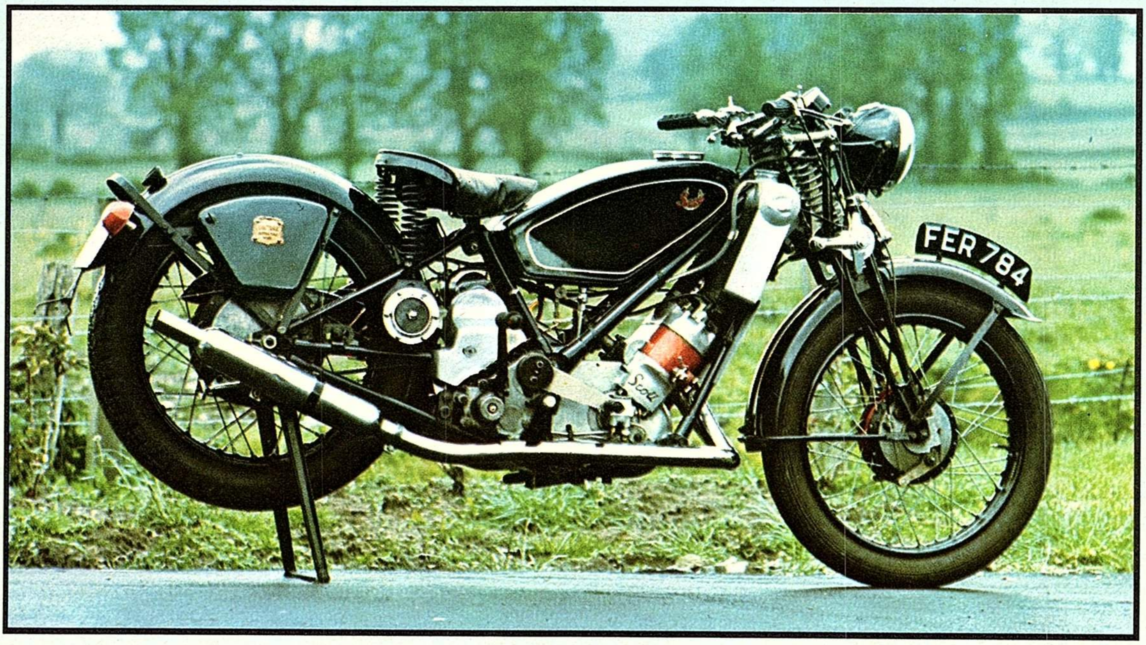
THE SCOTT FLYING SQUIRREL

By Jeff Glew

When Alfred Scott built his first twin cylinder two-stroke engine at the turn of the century, he could not have realized that he was starting a trend that would be in fashion some seventy years later. Utterly dedicated to this type of engine, he persevered with his experiments and evolved a design that was sufficiently advanced to permit limited production during 1908. The breakthrough came only a few years later, when a machine bearing his name won the 1912 Senior TT in the Isle of Man. This success was repeated a year later and only narrowly missed in 1914. The motorcycling world began to take notice. Perhaps there *was* something very special about this unorthodox looking machine with its quiet purr and simple, but highly effective two-speed gear.

More surprising, Scott severed all connections with the company he founded immediately after the Great War of 1914–18. In typical fashion he had become obsessed with a novel but highly unorthodox three wheeler that had evolved from experiments with a wartime gun car. But the legacy of his motorcycle designs lived on and others took over the continuing development.

No one knows for sure how many Scott motorcycles have survived the passage of time. There are close on 1200 recorded in the Register of the Scott Owners Club, but undoubtedly many more exist in unknown hands. The best models are unquestionably the open frame models of the middle and late twenties; these machines have a more favorable power to weight



PHOTOGRAPHY: BILL DELANEY

In the Good Old Days, one learned to love a machine's idiosyncracies— or at least live with them. The Scott would, for example, bounce through a pothole and promptly over-oil itself. A bump, you ask, could foul a spark plug?? Sometimes. Crazy? Perhaps. Curious? Yes. Expected? But of Course.

ratio than the much heavier post-war models.

The very first of the post-World War II prototypes, a 1946 596cc "Flying Squirrel," is unique; at that time no firm decision had been made about the form of front suspension. Apart from the full-width hubs and dual front brake, the machine is virtually the same as the model 1939, even down to the Webb girder forks.

Engine design closely follows Scott's 1908 patent. The massive alloy crankcase casting has two crank chambers separated by a space to accommodate the exposed central flywheel. A built-up 180 degree crank keys into this flywheel and is of the overhung type having the main bearings inboard those of the big-ends. All bearings are uncaged roller-types; sealing is effected by means of spring-loaded metal glands around the crankshaft that are copiously lubricated with oil. Access to the big-ends is by means of a circular "door" in each side of the crankcase casting. It is through these doors that the crankshaft is assembled. Lubrication is provided by means of a twin feed Pilgrim oil pump bolted to the right-hand crankcase door and driven from the end of the crankshaft. It is gravity fed from an oil compartment within the main fuel tank and each feed can be adjusted independently to provide the rate of drip required. It is not in any way connected with the throttle and once the adjustment is set, it remains constant.

Narrow, knife edge connecting rods carry pistons of the deflector type, always a feature on the Scott production models. The gudgeon pins are of the fully floating type, with brass end pads. To reduce the risks of engine seizure, the full skirt of each piston is covered with a series of small grooves in the horizontal plane, each about a half-inch long. They provide a convenient means of retaining oil. Both the cylinder barrel and cylinderhead are water-cooled, relying upon the thermo-syphon principle and a massive radiator mounted above the engine. An Amal carburetor supplies the mixture; ignition and lighting is by means of a Lucas "Magdyno" chain driven from a sprocket rivetted to the right-hand side of the central flywheel. Another sprocket on the other side of the flywheel takes the primary drive to the separate, three-speed gearbox. This has an outrigger sprocket for the final drive, also by chain, to the rear wheel.

The cycle parts follow conventional practice in the main, apart from the use of a triangulated frame structure that gives the machine its unique handling qualities. This layout permits the use of a quite distinctive fuel tank that has a separate oil compartment and a controllable drip-feed lubricator for the magneto and primary drive chains.

One of two things would happen to the prospective owner of a Scott—either he would like it immensely and thereafter ride nothing else, or alternatively detest it from the start and never own another! Certainly the ownership of a Scott is a test of enthusiasm, especially if the machine has to be reclaimed from the inevitable heap of badly worn and rusty parts. Inevitably a most peculiar love/hate relationship will develop between machine and owner, even after restoration is complete in many cases. A Scott is a temperamental machine that somehow manages to retain an air of perverseness that will at times vex even the most hardened enthusiast. But when it is running well, Scott enthusiasts will tell you there's nothing better!

On the road, it is the turbine-like smoothness of the engine that appeals most, together with its smart acceleration when the throttle is snapped open. The exhaust note is normally a mellow, gentle purr. Acceleration at high speed produces the familiar Scott "Yowl," a noise that defies description. Hills are climbed almost unnoticed, apart from a slight buzzing overtone that seems to originate from the induction system. Whilst waiting at traffic lights and road junctions, the engine hunts in a characteristic manner, accompanied by a curious jingling of the clutch plates when the clutch is withdrawn. This will identify the presence of a Scott, even if it cannot be seen.

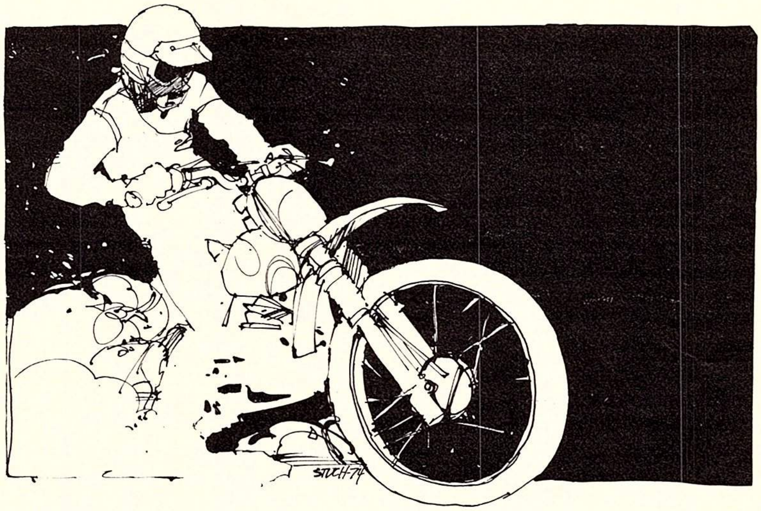
By modern standards, the brakes leave much to be desired. The twin front brake is the main culprit, surprisingly enough, and requires linings of the so-called "black pudding" type to achieve reasonable efficiency. The rear brake suffers because the alloy brake plate is not ribbed internally for extra strength. The first really heavy application permanently distorts the brake plate and thereafter much efficiency is lost. Fortunately this defect was soon eliminated on the later models.

Starting is easy because the Lucas "Magdyno" is driven at engine speed and therefore delivers a very healthy spark at low rpm. A special reduction gear is used to slow down the dynamo, which would otherwise soon cook the avc unit. A rubber-mounted "T" battery ensures the rigid frame does not give this vital component a too hard life, always a factor to be considered when a good measure of performance is available. The lighting set does not match up to modern requirements and will permit speeds up to only the 50mph mark without cause for concern. The beam from the separate bulb and reflector type of headlamp is no match against the dazzle from oncoming halogen lamps.

The Achilles heel of the Scott is undoubtedly the Pilgrim oil pump. The setting is critical. Although it should remain constant in theory, it is prone to vary on occasion without warning. Too much oil and the plugs will foul; too little oil and ominous rattles soon occur. The ideal setting is the classic "two spits and a drip" from each feed pipe at regular intervals, as viewed from the inspection windows. This gives a compromise where the machine does not over-oil too badly in traffic and does not dry up when given the gun. A most curious feature is the way in which the engine temporarily over-oils after hitting a pothole. This is caused by rapid agitation of the oil supply contained within a well in the base of each crank chamber. The well serves an important function since it contains sufficient oil for the machine to be driven up to eight miles at moderate speeds if the main oil supply ceases or runs dry. The choice of oil is critical too, and multi-grade or self-mixing oils have to be avoided like the plague except in dire emergency. The additives provide a high ash content, which quickly fouls the plugs. A straight SAE 40 is the answer; fortunately one British oil manufacturer makes a grade of oil that is especially suitable for the Scott.

Maintenance presents no real problems; but if it becomes necessary to remove either the primary drive chain or the magneto chain, it's a major operation. The main difficulty results from the need to feed the chains around their respective sprockets on the center flywheel. Even with the guide strips that are permanently mounted within the crankcase casting, this is no easy task. The knowledgeable rider keeps his old chains and links them to the chains requiring attention, so that one pulls the other into position. Even then it is no sinecure.

The Scott is something quite unorthodox. A pause by the roadside or a stop for refreshment invariably produces questions and comments from onlookers. A few are taken back by the unconventional appearance of the model and ask innumerable questions, such that it is frequently necessary to explain the left-hand crankcase door strap is not an exposed connecting rod! In short, whilst there is a real pride of ownership, never bank on being able to make a quick journey anywhere. ◉



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CIRCLE NO. 53 ON READER SERVICE PAGE.

Laguna Seca: Order Restored

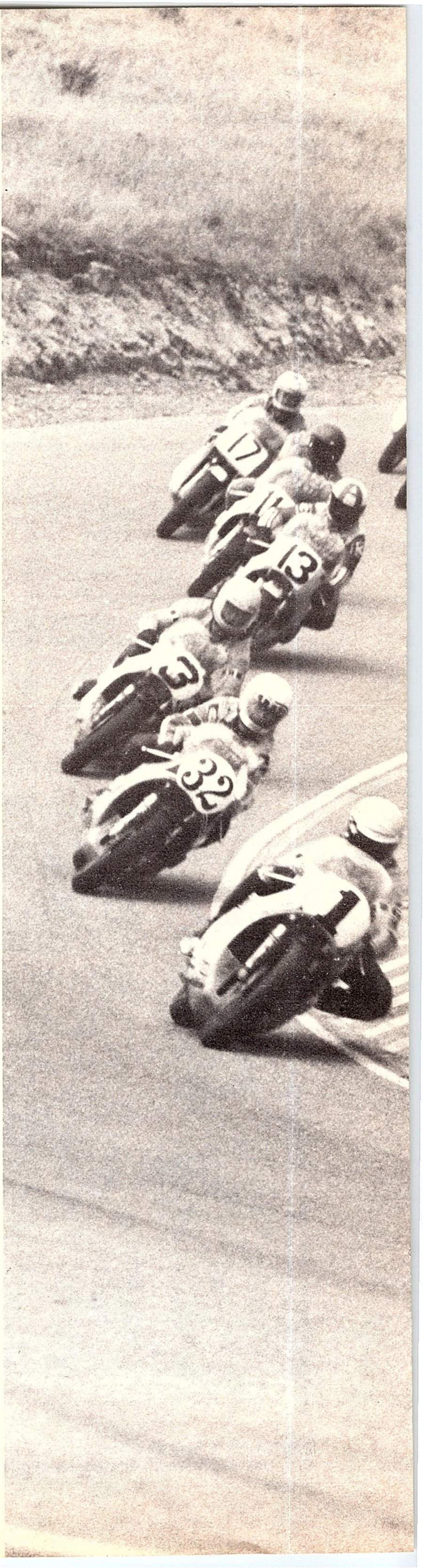
By Cook Neilson

● Watch a 250 race from a particular corner and visual rhythms begin to develop. The bikes are the same, after all. They look the same and they sound the same, they go through your corner at the same speed and bank angle, and they begin to accelerate onto the straightaway at the same time. Some are quicker than others, of course. But not so much quicker that the rhythm changes.

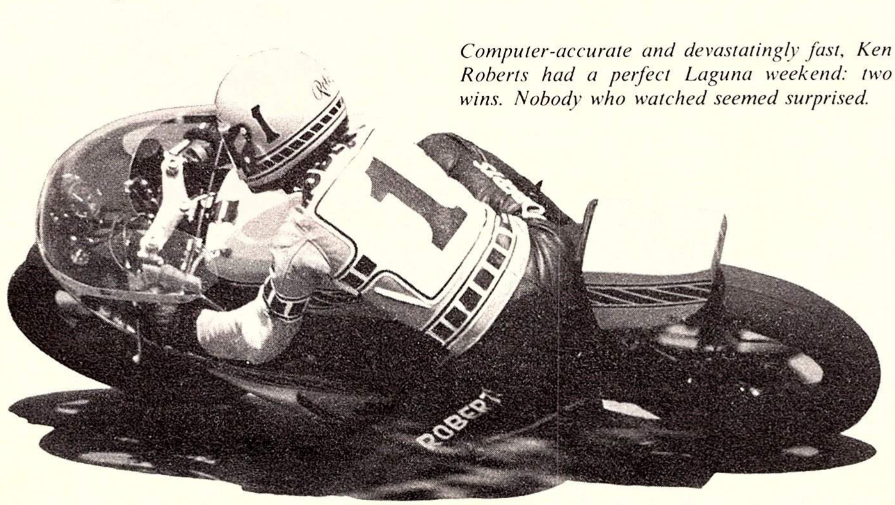
Except Kenny Roberts. At Laguna Seca in the Lightweight race he had a rhythm all his own, so bright and vibrant that he and his sunshine Yamaha became a travelling spark, a streak of noise and light that crackled with a peculiar incandescence. He was a glowing coal in ashes. With absolute assurance and transcendental speed he whistles up to, through and away from your corner and fragments the rhythm the turn has developed. He is not in touch with the traction between his tires and the pavement; he has become the traction, he has become the pavement, he has become the motorcycle and the tires. Everything he has learned is applied in those fleet seconds when he throws out the hooks, sticks out his knee, pitches his singing Yamaha directly to the limit and then hops back on the gas and disappears up the straight, over the hill and out of sight. Before he arrived at your corner you had seen brightly colored 250 Yamahas ridden by brave young men all going much too fast and making too much noise. In Kenny's presence they and their motorcycles are transmuted into background; only after he leaves do they once again become racers racing. He is in color; they appear as differing tones of gray. Kenny vanishes and the visual rhythm of your corner slowly re-establishes itself. You can enjoy it for a minute and fourteen seconds—and then Roberts comes again to shred it apart with a rhythm of his own.

To say that the Laguna Seca Lightweight race was a typical Roberts performance would be saying too much. Gary Scott, after all, rolled Kenny under at Loudon, and he or Don Castro might do it again at Talladega or Ontario. But at Laguna Roberts, with a 4-horsepower increase that Kel Carruthers had reportedly found hiding in an unexplored cavern of the Schnurle, was superhuman. And the Lightweight race was simply a warm-up; in the 75-mile National the competition didn't turn into background, because Kawasaki 750s and Suzuki 750s and Yamaha 700s ridden by other Ace Pilots are always interesting to watch. But the Roberts mastery was the same. So were the results.

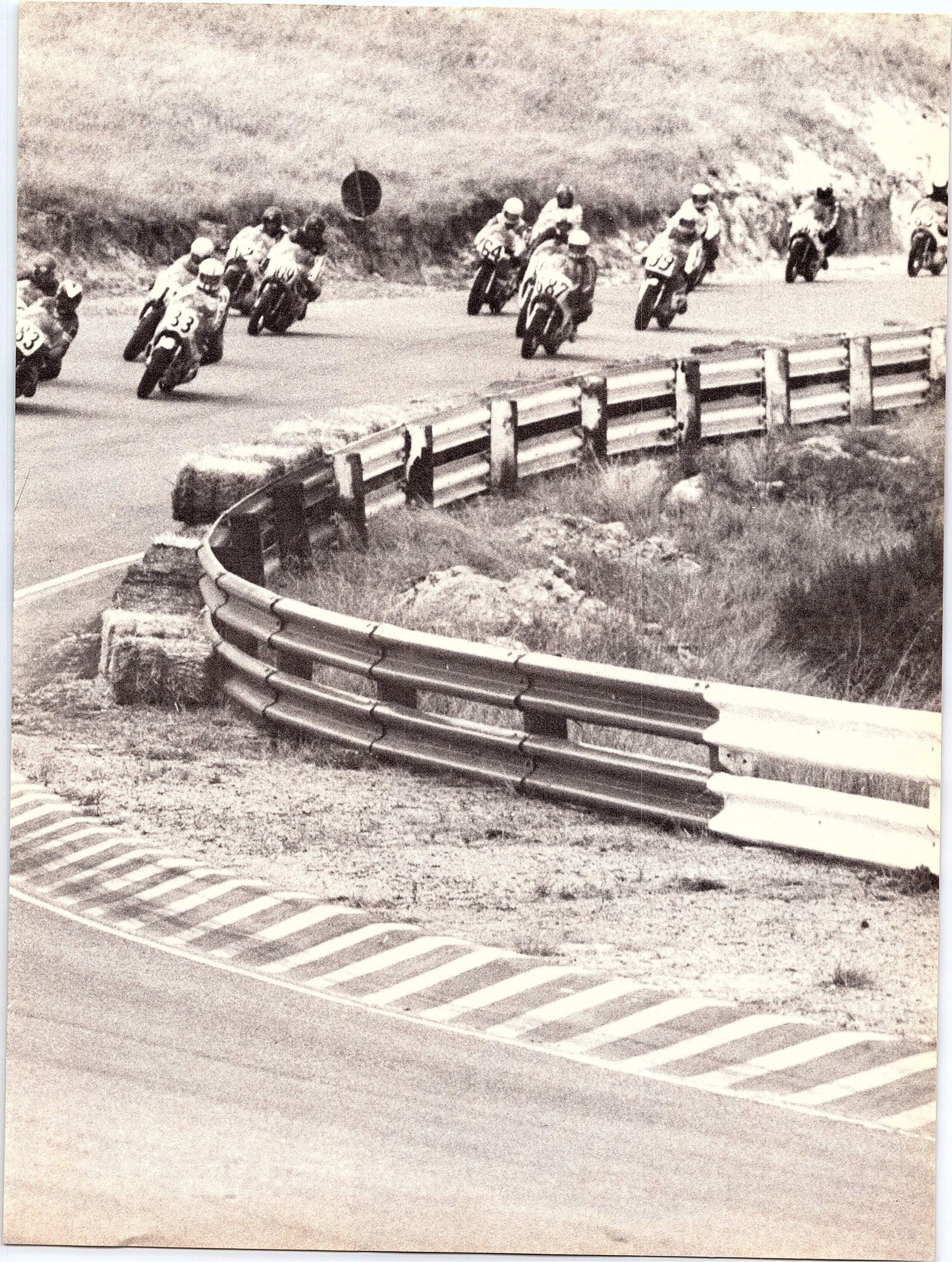
The ebb and flow of events at Laguna Seca began this year—traumatically—on Wednesday, four days before the National. Kawasaki had rented the track for an exclusive, uninterrupted test session, and Yvon duHamel, whose Randy Hall-tuned H2R had been no faster than Gary Scott's 750 Harley-Davidson at Loudon, was clattering around in pleasing proxim-



Computer-accurate and devastatingly fast, Ken Roberts had a perfect Laguna weekend: two wins. Nobody who watched seemed surprised.



PHOTOGRAPHY: DALE BOLLER, FREUD FREUDENBERGER, MUSH EMMONS, STEVE FRENCH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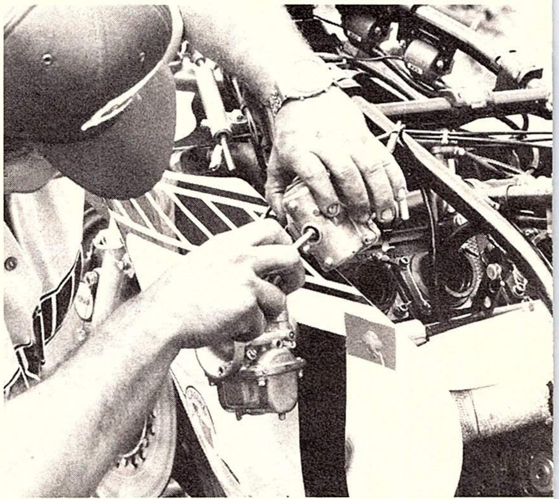
ity to Yvon's 1973 track record. But on the final scheduled lap of practice the Kawasaki threw itself to the ground in a fit of pique—on top of duHamel's right hand. "I hate to hurt my hands," Yvon said as he was sipping a coke next to the motel pool the following day. "Whenever I crash I try to keep them from getting torn up. But this time my right hand is caught between the motorcycle and the pavement, and the fingers are twisted like this, and all the meat between them is messed up, and I think one is dislocated." Corkscrewed again. Yvon set off to make it heal by Saturday, when he was scheduled to fist-fight a Kawasaki 900 Z1 in the Heavyweight Production race. There were rumors that he simply took his hand to the local heliarc welder and had his damaged fingers Stellited. One way or the other duHamel was sound enough Saturday to deal with the Z1, and by Sunday, with the help of an extra-long front brake lever fabricated by Ken Watkins in Santa Ana and flown to Laguna, duHamel was sounder still, and braver than ever.

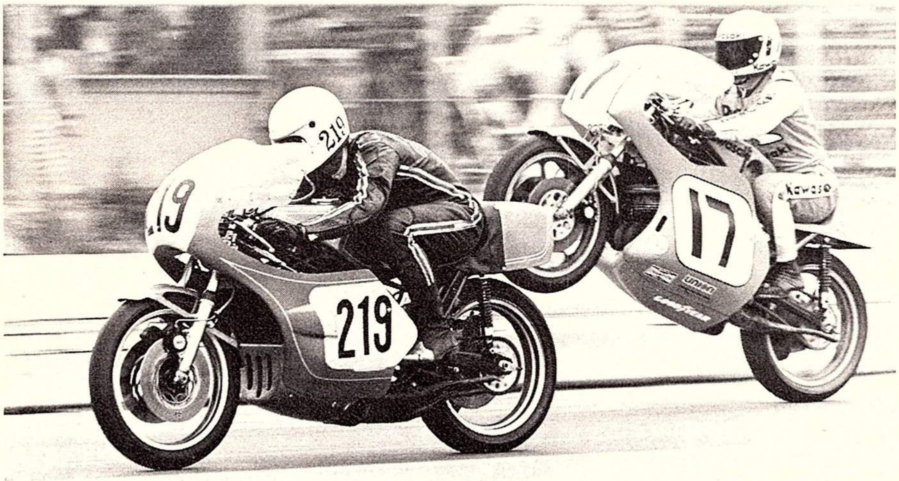
In the Lightweight race, Roberts avenged his Loudon defeat with a thorough-going victory.

Yvon is not the entire Kawasaki team. Hurley Wilvert (and his Australian protégé, Gregg Hansford) and Art Baumann also ride H2Rs; but there are differences. One big one: Art doesn't get paid nearly as much as Yvon, and Wilvert doesn't get paid anything at all. Hurley is, in fact, the only AMA Expert road racer whose entire income comes from track-side pay windows. He had a lucrative Daytona, but things have been thin since then. He was looking to do well at Laguna—not for the glory, not for the press coverage, not to land a spiffier factory ride. Hurley was looking to do well so he and his tuner, George Vukmanovich, could start thinking about eating well. "Hey," said Baumann, "this is supposed to be a team thing, where everybody helps out everybody else. But we don't really function like a team at all. I mean Hurley's one of the great riders and tuners in the world, but if he finds out something that might help all of us he can't really tell us what it is, because he has to try to beat us as hard as he tries to beat everybody else."

When the weather changed right before the National, nervy Kel Carruthers ordered a jet change.

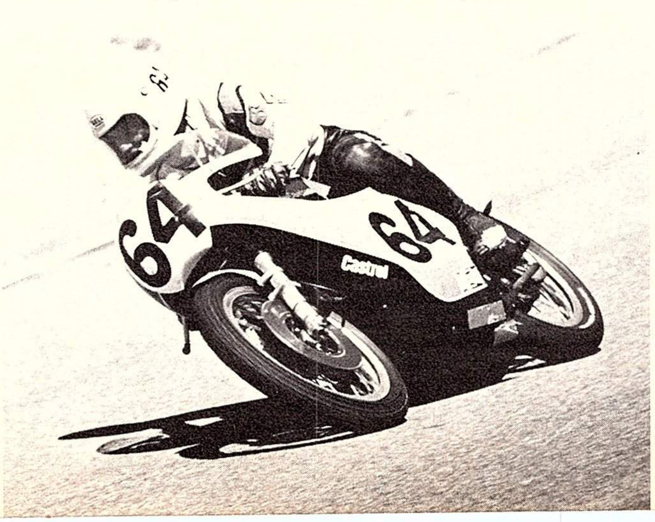


Things seemed a little calmer in the Suzuki pits. As Kevin Cameron reported in the September issue Gary Nixon had ridden his special American-framed Suzuki to a spectacular win at Loudon, and the factory bikes that appeared at Laguna Seca showed traces of the Erv Kanemoto influence: fork rake was exactly between Suzuki's own Daytona geometry and that which Nixon and Kanemoto introduced at Loudon. "It goes around corners ok now," Paul Smart reported. "But it has a little problem with straightaways. Tank-slappers." Nixon himself, co-architect of the Loudon win, was resting unhappily back in Maryland. He had been doing some testing on the 108-hp. Suzuki square four 500 in Japan in the company of Ken Araoka when the bike "seized so fast I couldn't even feel it" and plunged him, and Araoka, into a horrible pile-up. Nixon emerged with two severely broken arms, predictions by several doctors that he'd be through for the balance of the 1974 season, and his own clench-jawed resolve to return for Ontario. Kanemoto was at Laguna nonetheless, helping out whoever needed help.



duHamel mangled his right hand in an early practise session, but came back for second in Main.

Team Yamaha, with the return of Don Castro (injured after Daytona in the San Diego Cal Rayborn Benefit race), was once again at full strength, the 250s beneficiaries of Kel Carruthers' reaction to the HD/Gary Scott win at Loudon, the whistling 700 Fours sounder and faster week after week, and the riders cool and happy. And then there was the Harley-Davidson team, consisting of Dick O'Brien, Clyde Denzer, Bill Werner, Babe DeMay (tuners) and Gary Scott (rider). Scott had



Gary Scott's HD 250, allegedly detuned for tractability, was not quite up to Roberts' searing Lightweight pace (left).

won the lightweight race at Loudon and followed with a win at the San Jose Mile National, another at the Castle Rock TT National and a third at the Ascot TT National. To say that Gary was hot and hungry at Laconia would be like saying Paul Bunyon had some size, or that Attila the Hun enjoyed a fight. With his three consecutive National wins Scott had closed to within 99 points of Roberts' AMA-leading total of 1122. He knew that against Roberts' superior four-cylinder horsepower he didn't have a chance of whipping Kenny at Laguna, but he was anxious to finish high and collect some points. To do it he would have to ride the tires off his Harley. Which is exactly what he did.

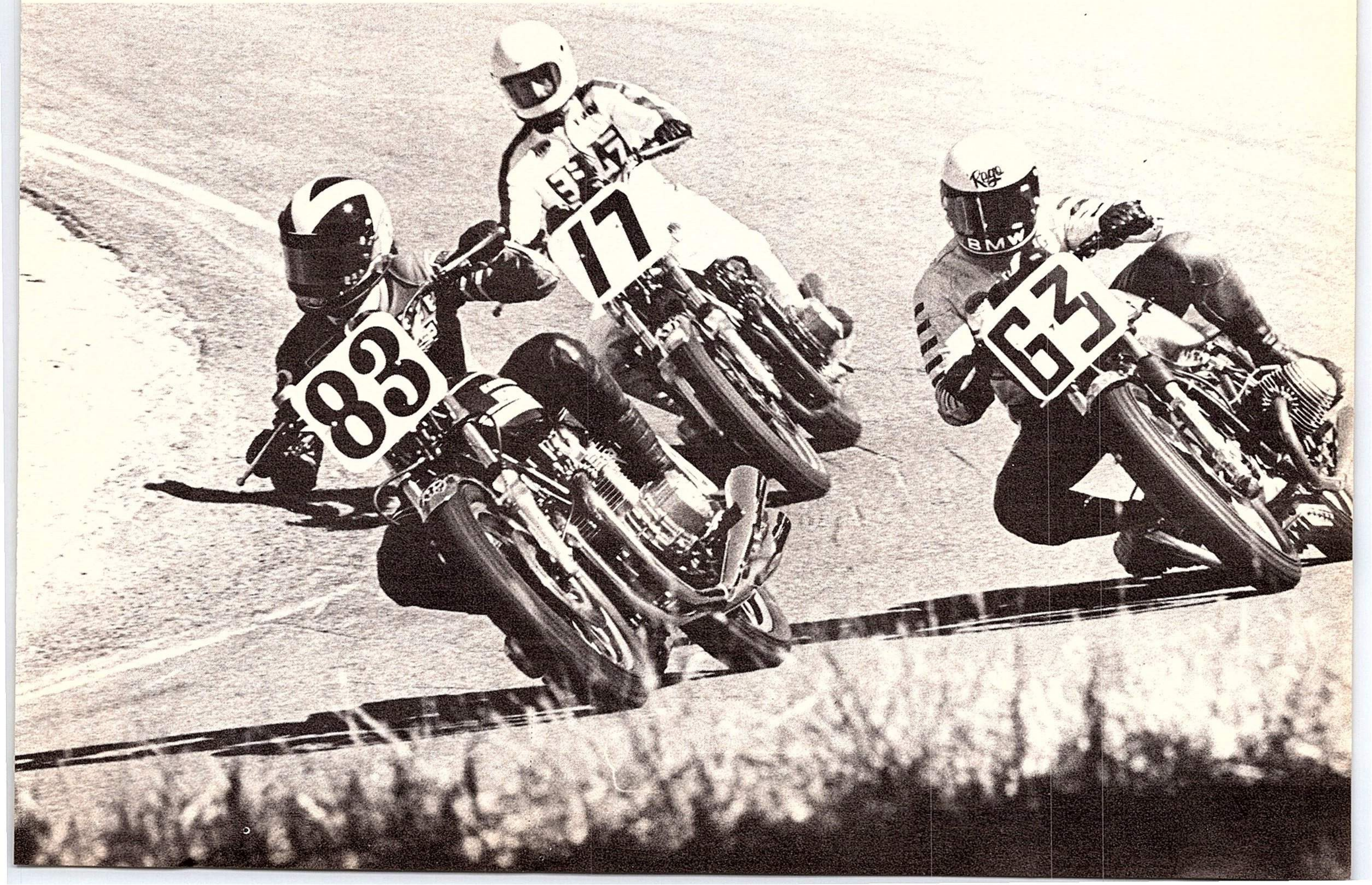
But before that there were numerous events to be run, the first of which concerned the Novices, most of whom, of course, were on Yamahas. The best of them was Skip Aksland, who under the tutorial eye of sponsor Kenny Roberts (Skip's father had sponsored Kenny when he was a youngster; turnabout is fair etc.) buzzed to an immediate and commanding lead and won easy, followed by Don Vesco's Novice, Murray Hoffman, Ted Davidson, Richard Fuller and Darrell Lee.

Next up was the Junior-Expert Lightweight Combined event. Roberts had whipped Scott, Dave Smith, Pat Evans, Ron Pierce and Walt Foster in his heat, and teammate Gene Romero had won the second heat ahead of Don Castro, Mike Clark, Mike Devlin, Pat Hennen and Steve Baker. It was clearly going to be another eyeball-to-eyeball-and-see-who-blinks scorcher between Roberts and Scott. Roberts hardly ever blinks. "The bike was running all right," HD Racing Chief O'Brien said afterwards. "But Gary felt he was being outridden by Kenny in a couple of places on the track. When Gary beat Roberts back at Loudon, Kenny wasn't outriding Gary *anywhere.*"

Nobody could have outridden Roberts on that track, on that day. He was flawless everywhere on the course, completely confident, superior in traffic, and his bike never missed a single 58-hp. beat. When it was over those who had seen the race had seen perhaps the most meticulous road race effort in Lightweight history. Roberts was unbelievable, indomitable, overwhelming. Gary started out close but gradually dropped astern, still well ahead of Don Castro and Pat Evans. Pat Hennen barely squeaked Dave Smith for fifth, Steve Baker was eighth, Ron Pierce brought his new AerMacchi 250 twin in for ninth and Walt Foster was tenth. Who, you may ask, was seventh? None other than Jody Nicholas, making his first National appearance in two years. Jody was aboard a Vesco Yamaha, and while the rust was apparent so was the beautiful style, the experience and the class. Jody, as you may recall, was a member a while back of the Suzuki factory racing team along with Ron Grant and Art Baumann. In an incredible display of talent he won the Road Atlanta National in 1972 only to have it taken away from him when his team bike was found to be illegal. He rode for the rest of the season for Suzuki, piled up a huge number of Ascot wins on a Norton, had a series of serious crashes and dropped out of AMA competition—and out of sight. It was a treat to see him back in combat; class is always fun to watch.

There was more on the way. After Bob Tigert made a little mistake and crashed his Lightweight Production bike and saw Wes Cooley win, the Heavyweight Production field formed on the grid. DuHamel, sore paw and all, was going to have a go on a Kawasaki Z1, Reg Pridmore was ready with Helmut Kern's new (and obscenely potent) Butler & Smith R90S BMW, Steve McLaughlin was riding a Z1 for RC Engineering, Justus Taylor had another big BMW as did Ron Pierce and Marty Lunde, and Fred Walti and Bob Crossman were piloting still another pair of Z1 Kawasakis for Exhibition Engineering. Predictably McLaughlin, Pridmore and duHamel rocketed to the front. But then Steve's Z1 tied up. And then Ron Pierce's BMW tied up. And then, after a dazzling ride, Reg Pridmore gave the lead back to duHamel and parked *his* BMW, and Yvon was almost home free. But not quite. Already having difficulty

In Open Production, Steve McLaughlin's RC Engineering Z1 led and packed up, Reg Pridmore's BMW 900 led and packed up, and duHamel won.



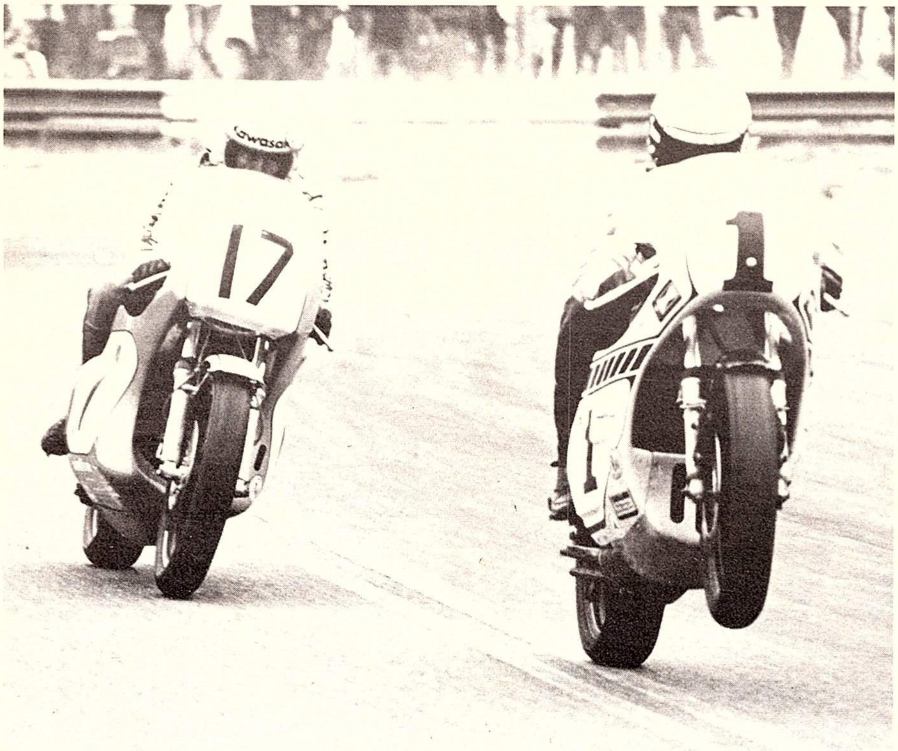
with his front brake (because of his damaged hand), the rear brake rod came adrift and Marty Lunde began to close. But there wasn't enough time for Marty and Yvon, his hand bleeding, won convincingly. Fred Walti, after a couple of early-lap tire-slides on the downhill off-camber left, settled down for a solid third, and Taylor scrambled in fourth.

Which closed out the activities for Saturday.

After the fog lifted Sunday morning the first of the two Expert heats formed on the grid and exploded up the hill, duHamel in the lead followed by Roberts, Steve McLaughlin on the Mel Dinesen/Motor-Cycle Weekly Yamaha 700, Art Baumann and Don Castro. By the fourth lap Kenny was right in Yvon's stingers, Art had crashed, Smart had moved past McLaughlin and Wilvert was right behind him. A lap later Roberts was in front and despite power-slides and spectator-thrillers there was nothing duHamel could do about it except watch. Smart settled into third and McLaughlin pinched past Wilvert at the finish line for fourth. In the second heat Gene Romero banged fairings with Dave Aldana for eight laps before getting some breathing room. A thoughtful Pat Evans was third, and New Zealand's John Boote was fourth. Cliff Carr had worked his way up towards the front of the pack before his Suzuki made some expensive noises and was retired to the pits, where it was instantly fitted with a brand new engine.

Pat Hennen, now riding for Sid Damron and Ocelot Engineering, waltzed away with the first Junior heat and won by 11 seconds, and Walt Foster fought past Phil Frank's TZ-700 with his own 350 and picked off the second heat. Running consistent 1:17s in the final Hennen overwhelmed the rest of the Junior field. Larry Bleil and Phil Frank established themselves in second and third halfway through the race and there they stayed. Ed Eaton was fourth. *Everybody* rode Yamahas.

One last issue needed resolving. The line-up: Roberts on the pole, Romero, duHamel, Aldana, Smart; Evans, McLaughlin, Boote, Wilvert, Baker; Scott, Phil McDonald, Warren Willing, Mike Cone. The top of the finishing order was ready for print on lap 6. Roberts was in front, duHamel had gotten past Romero for second, and Paul Smart was right behind. There they stayed for 40 laps: Roberts clicking off one perfect lap after another, duHamel, his right hand shot full of novocain, gallant and trying but down on power and acceleration, Romero professional and riding within his now-bountiful abilities, Smart dead astern and lacking the punch to get by. As the race progressed Roberts drew slowly away from duHamel, Yvon drew slowly away from Romero, and Romero continued to contain Smart.


The tone for the National was set in the heat race when Roberts got by a determined duHamel.

But back in the pack things were less processional and more passionate. By the tenth lap a six-man tag-team wrestling match was taking place at full volume: the contestants were Pat Evans, Steve Baker, Hurley Wilvert, Gregg Hansford, Dave Aldana and Cliff Carr, with Gary Scott just behind and looking for trouble. Wilvert had marched to the front of the jam by the 19th lap only to have his countershaft sprocket nut come off; Hansford tracked Wilvert towards the front and stayed there; Steve McLaughlin got past Baker and then was forced out when the bolts holding his rear sprocket in place sheared; Steve Baker was holding off Dave Aldana reasonably well until his Yamaha seized; and Cliff Carr moved in behind Aldana and stayed there until his Suzuki vaporized its front brake pucks.

Meanwhile Roberts went around, and Yvon went around, and Romero and Smart went around together. Pat Evans was safely in fifth for the last 15 laps of the race, Aldana was in sixth having dispatched Hansford, and Gary Scott, with an unbelievable effort, had closed to seventh. He would have stayed there for sure except most of the rubber on the left side of his Goodyear slick wadded up into an unpleasant mess near the bead and Gary was forced to slow, letting Hansford's Kawasaki past three laps from the end.

Except for one excursion into the weeds Roberts was perfect for 75 miles. You never see him do anything tentative, like lean his bike over for a corner and fish around for traction. He knows precisely how much traction there is, and where it is, and how far to lean it over to use all of it. When he puts the brakes on he puts them on full-force and all at once, knowing. When he turns the gas on he knows exactly how much power he wants to dial up, and he dials the precise amount with no hesitancy whatsoever. When he commits the 700 to a corner he commits it all at once, totally, knowing absolutely what he's doing. On his roadracer at Laguna he was a computer, and the whirs and clicks coming out of him that day sounded unlike any ever heard before. ◉

SUZUKI TS-400L APACHE

The all-new Apache has been thoroughly re-designed to better compete in the limited big-bore enduro field. Somehow though, it completely misses the mark.

● The TS400L Apache is not just a revamp of Suzuki's previous big-bore dual purpose machine. It's also a radical departure from accepted enduro bike design principles. The "L" model is wider, higher, stouter, guttier, quieter and faster than before. While up-dating the Apache Suzuki didn't just shuffle paint schemes around and change model designations. The L-model has an all new frame, fork assembly, cylinder, head, muffler, carburetion and intake systems and different transmission gears. All of these changes have given the Apache an entirely new personality—different than its predecessors, different than its competitors.

The previous two Apache models, though not extraordinary machines, were darn good combination street and trail motorcycles. They were very dependable (". . . 100% reliable" said *Cycle*'s road test of the J-model), easy to operate and strong running. What these Apaches lacked were good off-road manners and decent suspension units. The present major changes should make the new Apache a better dirt bike—hence a better street machine.

With their virtually untapped experience and knowledge of building world championship motocrossers, Suzuki should be able to make the Apache a better dirt bike with little effort. Any company that can acquire *six* world championship motocross crowns, 34 grand prix race wins and FIM manufacturers championships with their works machines has an edge designing and building exceptional production dirt bikes.

The new frame is an interesting exercise in design philosophy. While all new in structure, the frame retains the same ge-

PHOTOGRAPHY: DAVE HOLEMAN, DALE BOLLER

ometry as the old one. At 27½ pounds the mild tubular steel frame is no lightweight, but it is strong. The old frame was a single downtube assembly while the new is a double cradle chassis. Both have 30° head angles and the same engine location. The near-56 inch wheelbase has not changed; the swing arm retains the same basic dimensions as the old swing arm.

With the double downtube chassis design came a completely new cylinder, head and exhaust pipe. Use of a split, double downtube frame made it necessary to place the exhaust port in the center of the cylinder (rather than offset) to permit the exhaust pipe to pass directly between the chassis members. The cylinderhead has been given a smaller combustion area to raise compression from 6.8:1 to 7.3:1. Additionally, there's more finning on both the cylinder and head to increase the cooling area.

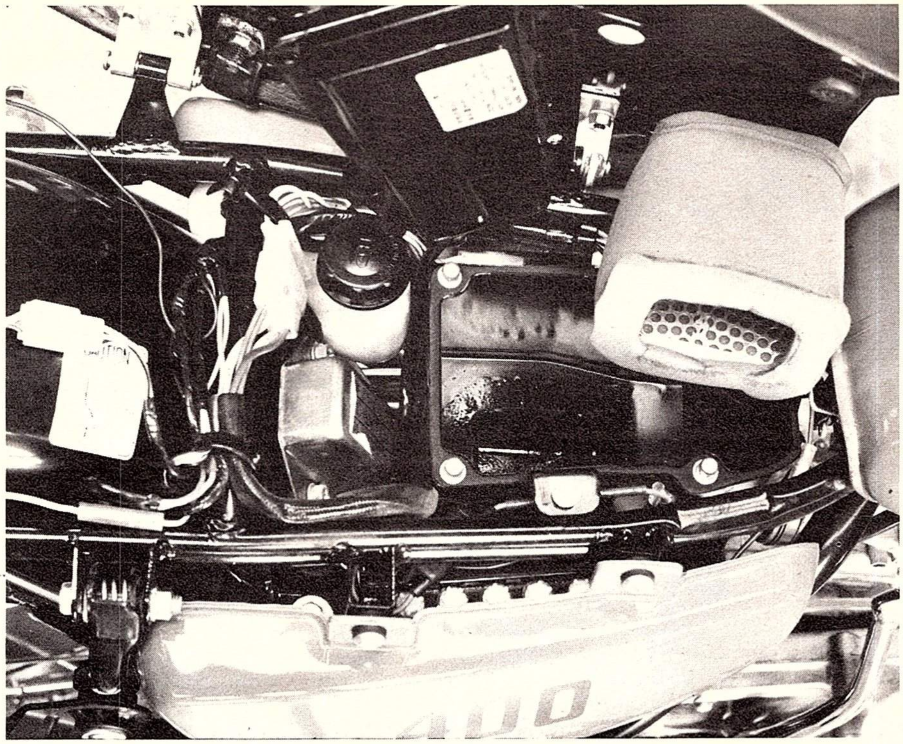
The new exhaust pipe is not only reshaped but has a different baffling system. The baffles are designed to reduce combustion explosion inside the sheet metal muffler. The spark arrester holds one new baffle inside the main body of the pipe while retaining the other baffle within the huge tail/stinger section. The old spark arrester has been replaced by a cast two-piece spiral catch unit.

Inside the big-bore two-stroke more changes have been made. All three versions of the Apache (J,K & L) have different crankcases, though the differences in the aluminum castings remain virtually invisible. Larger bosses, bigger reinforcing ribs, relocated holes and other improvements are not apparent to untutored eye.

Another internal alteration has been made to the top end. Rather than retaining a *floating rod* crankshaft Suzuki has fixed the lateral movement of the beam by placing thrust-type shims on either side of the small end of the connecting rod. This fixes the rod's side play by locating it on the wrist pin. This system may reduce needle-bearing clatter as the rod walks side-to-side.

The gear driven primary has remained untouched. Using straight cut gears, the huge oil-bathed, 14-plate clutch (seven cork, seven metal) revolves once for every 2.96 engine crankshaft revolutions. The clutch hub rotates on the transmission mainshaft end and spins on a caged double-needle bearing. Both transmission shafts turn in caged roller bearings. Other near-invisible changes have occurred in the gearbox. First and fifth gears have been lowered. First is now 2.285:1 and top is .807:1 in the "L" model compared with 2.066:1 and .840:1 respectively.

The new first and fifth gear-ratio changes were made to improve low speed trailing. But the speed differences between the old J and K models compared to the new L version are minute. We couldn't feel the difference when riding. At a constant 4000 rpm the J and K models went


Under the saddle is a maze of paraphrenalia: wires, plugs, air cleaner, oil tank, and magic box.

50.3 mph in fifth and 17.6 in first. The L version does 49.9 and 19.5 mph in the same gears—a reduction of 0.4 and 1.9 mph respectively.

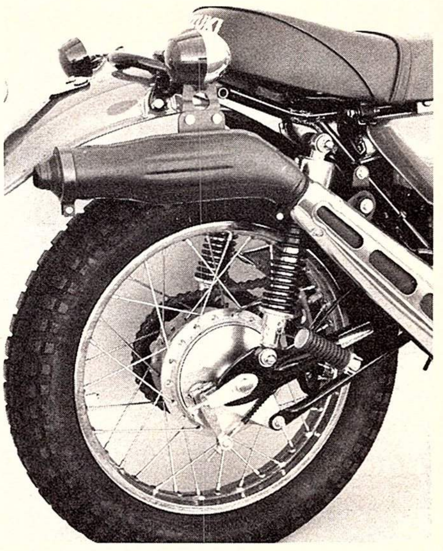
Elsewhere, the Apache displays the legal electrical equipment to fullfill its dual purpose street and trail features. The electrics are all 12-volt with power coming from the CDI flywheel generator. The seven-inch Stanley headlamp is joined by a large taillight, turn signals, lighted instruments—all of which operate with the engine not running.

Starting the Apache requires deliberate effort by the rider on the lengthy right-side kick arm. In order to ease starting, the big bore single has a relief passage which runs from the top of the cylinder bore to the exhaust port. It reduces compression pressure by acting as a minute high exhaust port which allows excessive pressure to run directly into the exhaust system. This passageway (in place of an external compression release) directs excess fuel into the exhaust system rather than on the engine's exterior. The best starting technique requires the rider to stand on the foot pegs with the side stand down and then kick the engine through.

With the gas and choke on, the engine always starts with three healthy kicks. Engine operating noise is fairly well muted by the rubber buffers in the cylinder fins. Still, the Apache has the two-stroke noises inherent with a big-bore engine. The piston rattles sporadically and loudly, and the drive train has a constant whir which relieved only slightly when the clutch is disengaged.

Whereas most all two-strokes perform like two-strokes, the Apache produces power like a four-stroke. Its flat torque curve is unmatched in two-stroke dirt bike engines. The trail rider's dream engine, the XL350 Honda, has been out done by the TS400L. The Apache develops 18.27 ft/lbs torque at 2500 rpm and a near identical 18.77 ft/lbs at 6500 rpm with only a 10 per cent rise in between. The Apache produces slightly more maximum torque than the 350 Honda four-stroke single, has an equally flat power curve and a broader power band.

When comparing the horsepower curves of the Apache and XL350 we again found remarkable parallels. The Apache produces one-half horsepower more than the XL350 at the same 6500 rpm. The power

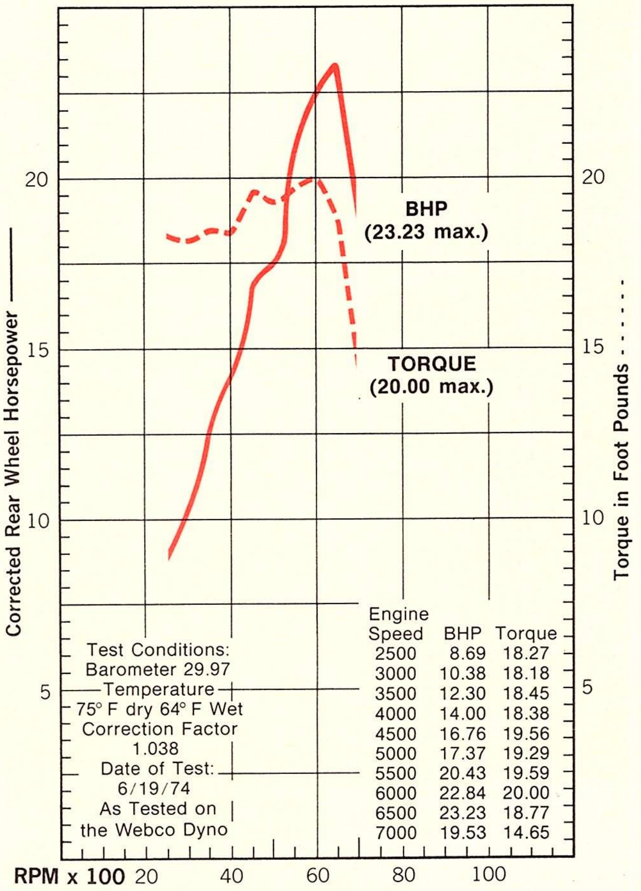


New muffler is heavy, with an unpleasant sound. The rear wheel slips and hops in the dirt.

On twisty roads the Apache is fun to ride while accelerating but staggers in mid-range.

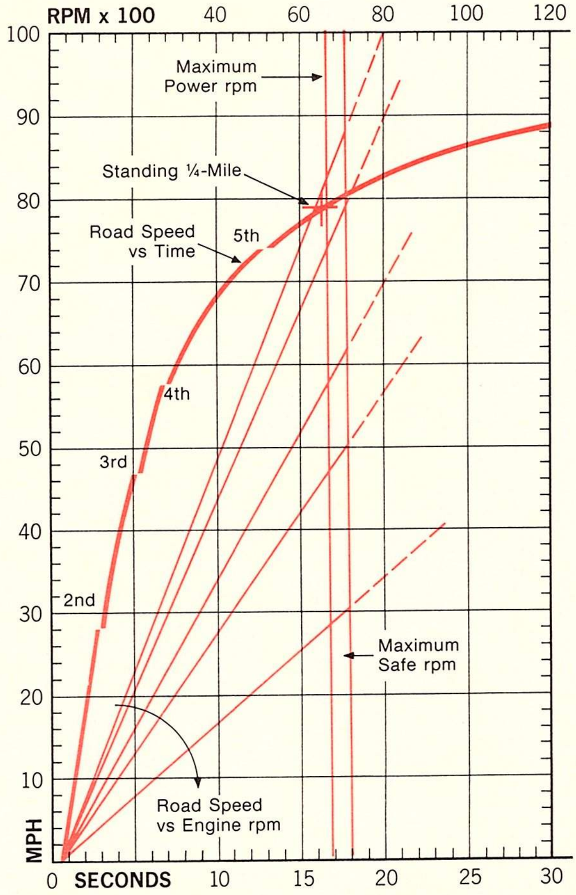
SUZUKI TS400L APACHE

Price, suggested retail	$1220
Tire, front	3.00 x 21 IRC Trials
rear	4.00 x 18 IRC Trials
Brake, front	4.9 x 1.18 in. (124.5 x 30.0mm)
rear	4.9 x 1.18 in. (124.5 x 30.0mm)
Brake swept area	36.33 sq. in. (234.7 sq. cm)
Specific brake loading	14.12 lbs./sq. in.
Engine type	Piston port two-stroke single
Bore and stroke	3.23 x 2.95 in. (82 x 75mm)
Piston displacement	24.2 cu. in. (396cc)
Compression ratio	7.3:1
Carburetion	1-32mm Mikuni
Air filtration	Polyurethane foam
Ignition	CDI
Bhp @ rpm	23.23 @ 6500
Torque @ rpm	20.00 @ 6000
Rake/Trail	30°/5.6 in.
Mph/1000 rpm, top gear	12.47
Fuel capacity	2.4 gal. (9 liter)
Oil capacity	2.5 pt. (1.2 liter)
Transmission oil capacity	1.25 qt. (1200cc)
Electrical power	Flywheel ac generator
Battery	12v-5ah
Gear ratios, overall	(1) 16.886 (2) 10.501 (3) 8.395 (4)7.080 (5) 5.964
Primary transmission	Spur gear 2.956
Secondary transmission	½ x ¼ #525 D.I.D. chain 2.5
Wheelbase	56⅜ in.
Seat height	32½ in.
Ground clearance	9½ in.
Curb weight	313 lbs.
Test weight	513 lbs.
Instruments	Tachometer, speedometer
Sound level (California Standard)	82.5 db(A)
Standing start ¼-mile	16.154 seconds, 77.78 mph
Average fuel consumption	25.23 mpg
Speedometer error	Ind. 30 mph = 26.33 Ind. 60 mph = 53.92



Test Conditions:
Barometer 29.97
Temperature
75° F dry 64° F Wet
Correction Factor
1.038
Date of Test:
6/19/74
As Tested on
the Webco Dyno

Engine Speed	BHP	Torque
2500	8.69	18.27
3000	10.38	18.18
3500	12.30	18.45
4000	14.00	18.38
4500	16.76	19.56
5000	17.37	19.29
5500	20.43	19.59
6000	22.84	20.00
6500	23.23	18.77
7000	19.53	14.65



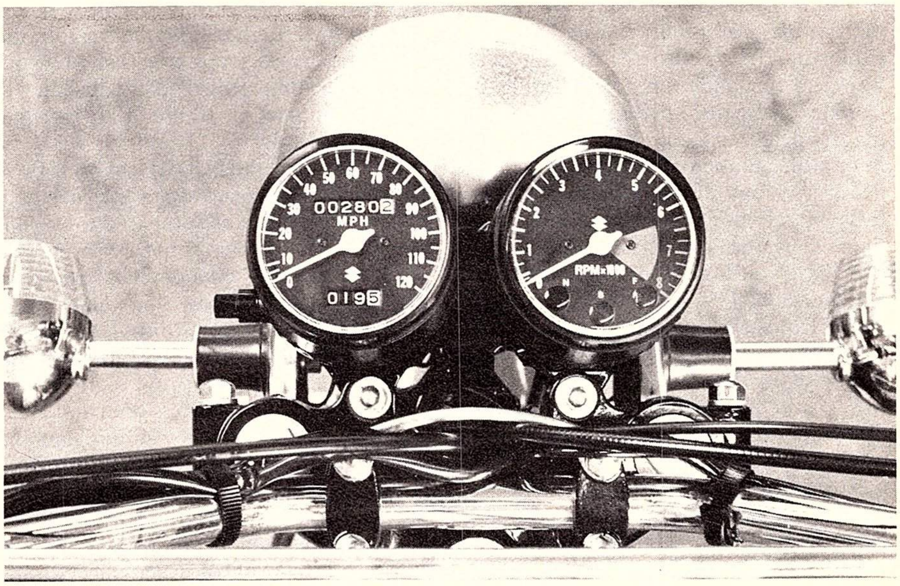
curves could almost be duplicates with the XL revving higher and the Apache pulling down lower. Other interesting similarities show themselves on *Cycle*'s specification charts. At 317 pounds (wet), the Apache weighs in at a mere two less than the XL350. Quarter-mile times are very close. The XL is only .37 seconds slower and has the same 77-plus mph terminal speed.

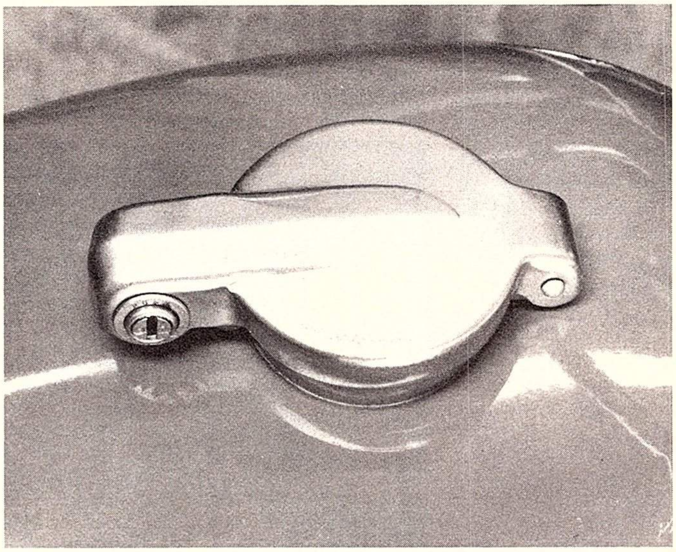
The gutty performance of the Apache makes it an outstanding trail bike engine. With all of the get-to-the ground muscle of a four-stroke, the TS400L is unquestionably the nicest and most civilized off-road engine in the big-bore street/trail machine field. With a moderate 23.23 horsepower the Apache can't match ponies with the Maico 400 Qualifier's 31.42. But then the Apache wasn't built up from a motocrosser. Rather it's been developed as a piece of street oriented equipment. The Apache performs with complacent civility—very appealing to the tyro big single rider. There's no sudden power surge or explosive, front wheel lifting reaction when the throttle is dialed wide open. The engine pulls like a locomotive. It's totally predictable and exceptionally smooth under load. The Apache pulled Webco's dyno with greater smoothness (absent chain lash and bucking) than any over-250 two-stroke to date.

In the dirt this type of smooth and predictable acceleration invites the rider into climbing, uphill sandwashes and goop-filled bogs. Fire roading with the Apache's engine torque is very enjoyable. Downshifting just one cog going into turns gives the rider full power control through a corner while still delivering surprise-free acceleration coming out into the straightaway. It's easy to manipulate engine performance. For the rider who's just getting onto his first really big dirt bike the TS400L Apache engine is perfect.

The gearbox and clutch are tremendously strong units. It would be difficult to imagine anyone being able to need more clutch in any dirt bike engine. The transmission, with its two new gear ratios, is still too closely spaced between cogs. With a near-flat 4000-rpm torque band, the higher gears could be stretched out further and the lower cogs brought down some without appreciably harming power loss between shifts. As is, first gear, with stock secondary sprockets (40/16 T), is far too tall for anything but level dirt roads and street riding. A smaller 15-tooth countershaft sprocket would aid low speed plonking. At 55-plus highway speeds the gutsy engine is spinning 4400 rpm and could easily pull along just as easily if turning much slower—say 3500 rpm.

Operation of the controls is easy and straightforward. All of the light switches are located within thumbs reach. The horn and kill buttons are matching left and right controls that also function at the flick of a thumb. The key switch is in a clumsy location under the gas tank; it could have been more conveniently placed in the console center. The clutch and gearbox operate with minimal effort.


Vibration shakes the instruments. Far too much front end weight ruins already poor dirt stability.


The locking gas cap doesn't leak. Riding range is only 60 miles.

The strong 12-volt electrical system produces the best lighting of any dual-purpose bike made. The huge headlamp and bright turn lamps equal the output of any street bike. The re-designed tail light has a shamefully dim running light although the brake lamp is quite bright. The ignition spark is very strong and assures foul-free running at low speeds.

Here the good aspects, all of which are exceptional, of the new TS400L Apache end. In their redesign Suzuki engineers have somehow failed to build a good dual purpose, street/trail, on-off road enduro bike. They re-engineered the old 400 Apache (a really good dual purpose, street-trail machine) into something far less.

The change to the double cradle chassis has not improved either the street or dirt manners of the Apache. In fact both are noticeably worse. The old Apache's forte

(Continued on page 98)

Baja Internacional

In the 14 prior Mexican off-road races a motorcycle has been overall winner only once. The 15th race had a new promoter, a new course, no politics and a bike took home all the marbles. By Dave Holeman

● The off-road cross-country motorcycle racer is the most totally devoted competition rider in the world. Racing every weekend for many hundreds of miles for trophies, single-digit number plates and scanty dealer sponsorships keeps them honorable amateurs who happen to be deadly serious about winning. Flash a little bit of money in their faces rather than the usual marble-based plastic trophy and these youthful gladiators will wrestle a rabid polar bear as long as it has handlebars and can be shod with knobby tires.

The arena for this group of racing specialists is the desert vastness of the southwest United States and upper Mexico. These millions of square miles are absolutely laced with old dirt mining roads, wagon paths, mission trails, power line rightaways, and dry stream beds that provide unbelievable racing challenges. And the true Mecca of off-road racing is Baja, where the challenge is the land itself and the prize is not only money but prestige. The only parallel in international news fame to winning a big money Baja race for motorcycle racers is Daytona, which is more intense but not as much fun.

In the 1968 Mexican 1000 race Larry Bergquist and Gary Preston became the only motorcycle riders to win any of the big Baja races outright, beating all the cars. They ran from Ensenada to LaPaz, 850 miles that year, in 20 hours, 38 minutes averaging 41.2 mph on their factory backed Honda 350 twin. But this may have served only to infuriate the four wheel competitors, as the subsequent evolution of Baja race cars, jeeps, trucks and buggies left the dirt bike, still virtually unchanged, back in the pack in all the following Baja races—until now.

For this race, the SCORE (Short Course Off Road Enterprizes) Baja Internacional 400, Husqvarna came prepared to do battle with anyone as never before. Even with Heikki Mikkola's phenomenal success on the Grand Prix circuit this year, Husqvarna's reputation as a formidable racing power rests on cross country race victories. Husqvarna's lack of prowess in recent years in motocross, professional and amateur, is a puzzle as they dominated the sport in its early years. Their 125s handle great but lack power and dependability; the 250s just never could cope with the fierce competition in their class and the 400s are a favorite of desert racers only. The 450 was a disaster.

Husky wins in Baja because of its riders, best in their field, and its eccentric, independent and truly incredible team manager for the big-money off-road races, Claes Nilson. Claes' involvement with Baja is one of personal and professional passion—a driving compulsion to win at any cost. Under his direction Husqvarna has completely dominated Baja victories for the past four years. But this race was by far the greatest and most convincing sweep of all. Here's how it happened:

Young gladiators Bakken and Mayes scored their second Baja win—this time overall.

PHOTOGRAPHY: DALE BOLLER, DAVE HOLEMAN

Baja big-money racing was virtually at an end after the Mexican politicians threw out Ed Pearlman's NORRA a year ago. NORRA had started the Mexican 1000 and 500 races and ran them successfully until it all sank in the Baja political quagmire. Greedy individuals, both American and Mexican, saw the races as easy money but mismanagement of entry fees and charity funds resulted in lengthy delays before finishers were paid. By their second race, this year's Baja 500, entries shrank to one-tenth of NORRA's draw.

Mickey Thompson's SCORE, made up of ten off-road racing groups, was brought in by the Governor of Baja Norte at the request of hungry merchants. SCORE was asked if they could get racing back on its feet again in Mexico. It could, and did. Superb promotion, excellent course layout, guaranteed prize money and a large contingency program brought in a whopping 372 total entries, 61 of them motorcycles. The prize money was to be 50% of the purse for each class. Entry fee was $350 per vehicle. Ten entries in one class meant half the entry money, $1750, came back to the top finishers. The motorcycles have three classes under SCORE's rules: 125cc, 250cc and Open.

The course was said by all the riders to be the best thought out and one of the fastest they had yet seen. Only 3 miles of the entire course were paved. The roads

ranged in make-up from weaving, smooth, sandy, high-bermed, flat-out, fifth gear cross-country dreams to gravel-coated, off-camber, slippery, third-cog, half-throttle heart-stoppers. The start and finish were at Ensenada, which is on the Pacific coast of Baja 75 miles south of the border. The route ran out from the very center of Ensenada, up a dry wash, through a cardboard shanty-town and toward the center of the peninsula.

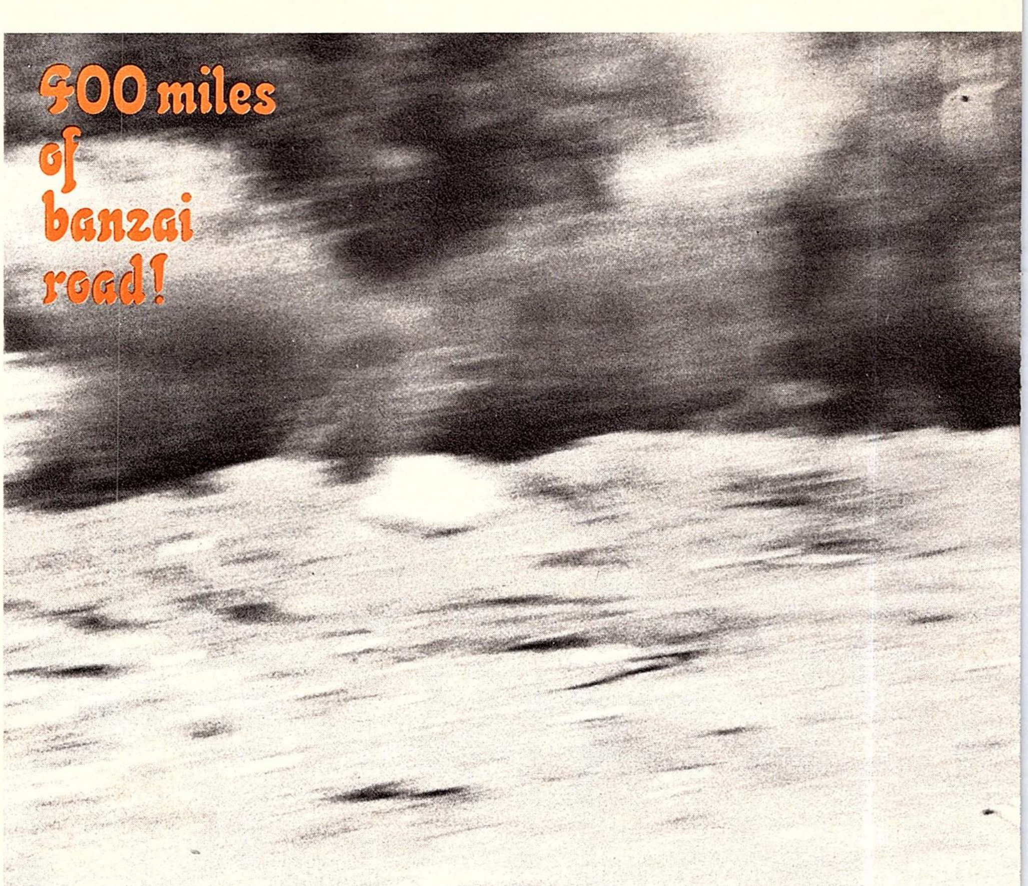
The terrain varied from talcum powder dust bowls to high altitude logging forests to barren desert to ocean beach to rain soaked canyons. The course was noticeably less severe than those for most other Baja events and nothing like many of the brutal Mint 400 races. The motorcycle survival rate was correspondingly higher, with 44 finishers out of 61 starters. As a comparison, 72% of the bikes finished while only 43% of the cars made the 380 miles. What the course lacked in severity of terrain it made up in grueling speed.

Every minute two vehicles left the starting line ramp at the same drop of the flag. The motorcycles started 90 minutes ahead of the first cars to eliminate the two being in the same sections at the same time. All of the serious entrants and most of the also-rans had pre-run the course (permitted and encouraged in the Baja races). The race was run over a marked route—meaning all the entrants had to stay on the prescribed course with no short cutting permitted. One exception was a 35 mile section along the beach that had a few alternates as long as the vehicles stayed away from the highway. Policing of the course was done by plane and helicopter.

Before the race started the favorites were Mitch Mayes and A.C. Bakken on their 400cc six-speed Husky, picked because they were the winners of the last Mexican 1000 by 3½ hours. A newcomer to Baja racing in the 1000, where he replaced injured Swede Rolf Tibblin, A.C. again partnered with Mayes in the SCORE 400. This time Rolf had visa problems preventing his travel out of the U.S. Mitch and A.C. had the bike, probably the best from Nilson's stable, and they had the team experience so necessary for equipment survival.

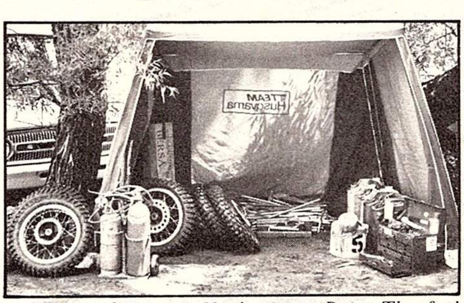
But other teams in the open class could readily slip in for an Open class win at the slightest faltering of Husky's number one entry. The Brooks brothers, Cordis and Tom, were probably the fastest pair teamed in the race on a 352 Bultaco. Odds were, with Bultacos' past record in Baja, that they wouldn't make the distance—they didn't. It blew six miles from the start. John Watkins and Todd Martella are rock steady fast and long time Baja vets. Riding a 400 Husky in place of their big Suzuki they again fell victim to rotten luck: coming into check five at Mike's Sky Ranch fifth gear shucked its engaging cogs.

Howard Utsey, near-winner of past Mexican races, teamed with Mint 400 victor (with Rolf Tibblin) and motocross



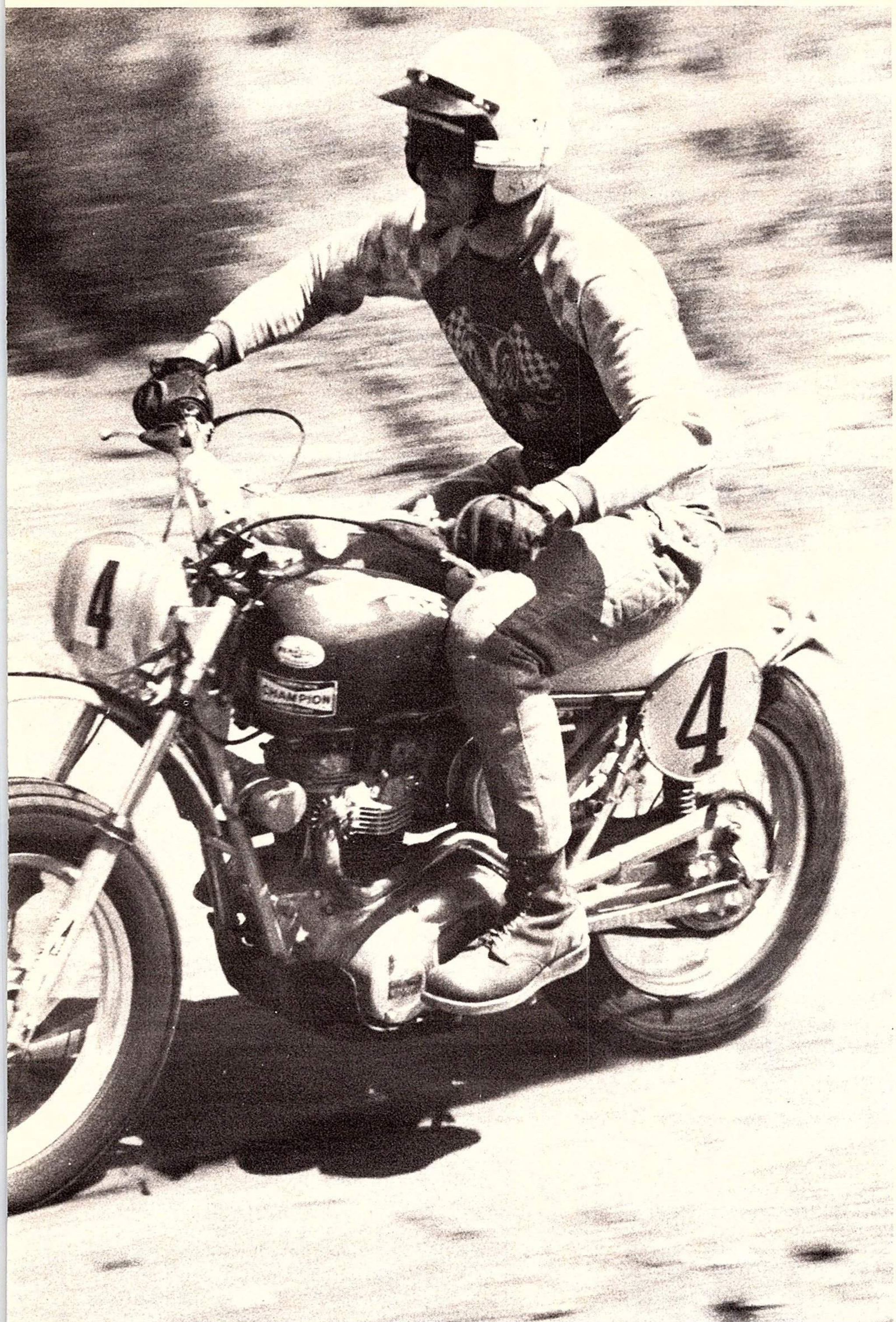
400 miles of banzai road!

Unlikely looking genius, Claes Nilson directs Husky's Baja battle plans and builds the bikes. Huskies blew off everyone—cars and bikes.

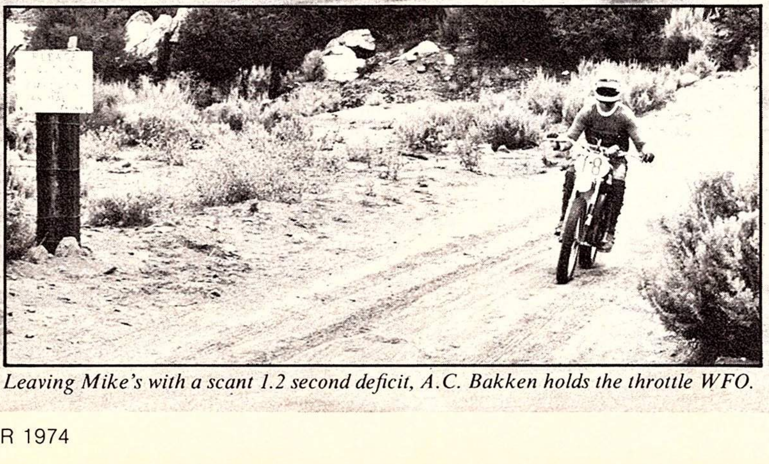


A portion of Nilson's Husky pit in Baja. The fuel is special and $1000 of wheels are newly shod.

PHOTOGRAPHY: DAVE HOLEMAN, DAVE BOLLER



Hopeful after a second in Last year's Mexican 1000, the Dempsey brothers just couldn't match the pace of the Huskies on their immaculate 750 Triumph. A crash cost them their front fork.



Leaving Mike's with a scant 1.2 second deficit, A.C. Bakken holds the throttle WFO.

ace Bob Grossi. Perennial favorite of everyone, (including competitors like Claes Nilson) were the bear-like Dempseys, Gene and Sam, on their beautiful 750 Triumph twin. Oldsters Dick Vick (43) and Niles Ussery (37) were probably the toughest and steadiest pair in the race. None of these teams are absolutely the fastest but they seldom make mistakes. If the leaders sneeze or blink their eyes at the wrong time these veterans will be right there. They know how to capitalize on mistakes or errors in judgment.

While Husqvarna completely dominated the open class in both entrants and finishers, the 250 class had not one Husky. There were only two real strong 250cc teams in the race and most people figured both would break. Baja has been fatal to most 250 Elsinores and Pentons in the past—especially to their gearboxes. Pegged the fastest were Al Baker (a part time test rider for Kawasaki product research) and Steve Holladay; both very quick, both hard on equipment. They were on one of the very rare American Honda-sponsored entries that we've seen in these races; an Elsinore prepared in their motocross department. The other fast team on a private 250 Penton was that of Mark Adent and Bob Messer.

The small bike class entry had most of the known, running 125cc Huskies in the country. Four were entered, and somehow all finished. The race oddsmakers had the contest as being Husky's Mickey Quade (previous Baja winner) and Nils Arne Nilsson (motocross champ) against the winners of the last 1000 on their 125cc Elsinore once again, Preston Petty and Dick Miller.

Because the race is more against the clock, elapsed time, than the rider in front it's critical that the favorites know just how fast a pace to run. If they go a notch too fast they'll break the machine or fall; if they go a notch too slow they lose to the sleepers and veterans. It's a game of incredible precision—pacing is the unknowable but vitally important factor.

Mayes, the favorite, decided to set a pace to the rider change-over point just like he was riding one of the longer 1000 mile races. He was relatively confident that faster teams like the Brooks brothers would break or fall while he remained quick enough but mechanically secure. The rider changeover stop was 190 miles out at a village called Camalu and having left on the ninth minute (riding number 18) Mayes was at check three, 145 miles into the race, before he received any confirming report on his competition.

Mayes was stunned by a radio report that he was four minutes (about three miles) in arrears to an unknown rider named Steve Sterner, also on a 400 Husky. Not wanting to give Bakken a deficit to make up, Mayes unleashed a maximum effort for the 35 mile beach stretch into Camalu. The unknown, Sterner, (a desert racer from Southern California) had played another game called WFO (Wide Freaking Open) and caught the favorites with their leathers down.

Husky's central pit was at Mike's Sky Ranch, 55 miles past Camalu, as were most other factory teams, both bikes and cars. Radio communications were fairly good and all of the motorcycle crews listened anxiously to the checkpoint arrival times. Interest in the reports turned to shock when the word came over that Mr. *Nobody*, Steve Sterner, had such a substantial lead. Claes Nilson was quite apprehensive about the privateer as he realized that Mayes might get rattled about his deficit, banzai it and crash. Claes' reaction, in his strong Swedish drawl, to Sterner's motocross pace was, "He's (Sterner) going too godamn fast. He make Mitch break my modocycle."

With considerably more pre-running experience to feed on than Mayes, Sterner took a legal short-route into Camalu that Mitch somehow missed. As seen by the patrol plane, this route can gain three minutes for a motorcycle over the road taken by Mayes. There was no question that Mitch was faster than Sterner, but Steve's better planning allowed him to arrive in Camalu still in the lead.

When word came over the radio about the standings at Camalu the crowd was still stunned that Mayes, now riding WFO, could only pull two minutes off Sterner's lead. With the riders changing to A.C. Bakken on the factory Husqvarna and yet another *unknown*, Danny Robinson, on the leading private 400 Husky six-speed at Camalu, Claes then expressed concern that A.C. would over-cook it trying to make up the last two minutes. Claes said, "I just hope dis Robinson ain't so godamn fast as Sterner."

The 56 mile route into Mike's Sky Ranch from Camalu was just a sprint for the second half riders because of a mandatory 60 minute layover there. The layover was to prevent two way traffic on the section east of Ensenada with the early bike entries and late car starters. A.C. Bakken let it all hang out and came into Mike's with a deficit of only 1.2 seconds!

With the unknown privateers from Competition Cycles of Vista (Calif.) virtually tied with the factory team, they each had an hour at Mike's to go over the bikes for the remaining 135 miles. Just behind these speedsters the rest of the race was equally exciting though not as well ordered. The battle for the 250 class win initially appeared sewn-up for Al Baker on the factory Honda Elsinore. At the first check, 50 miles out, he had pulled away 6.01 minutes, almost six miles, on Mark Adent on a 250 Penton. Nobody else was really in the hunt. But things changed drastically at checkpoint two when Baker suddenly fell 2.99 minutes behind Adent. Mark had made up the six miles, plus another for good measure. Adent kept on stretching out his lead and when the Penton reached Mike's it had 13.99 minutes on the Elsinore.

Everyone foresaw a tremendous battle between Nilsson and Quade on their factory 125cc Husky (if it didn't break) and the Elsinore ridden by Preston Petty and Dick Miller. In a shattering of expectations Petty first lost five minutes when he drowned the engine in a mudhole before the first check, and his ride was concluded a hundred miles later when the crankshaft end broke off at the magneto taper.

Re-starting from Mike's was done with electronic clocks precisely 60.00 minutes after each rider's arrival. The distance from Mike's to the finish was the faster portion of the race, with the bikers averaging from 46 to 52 mph between sections. Again the race between Bakken on the factory Husky and Robinson the unknown privateer continued. A.C. was confident when he left Mike's that he could stretch out a comfortable lead over Robinson because of the two minutes he made up out of Camalu. However, as the

(Continued on page 89)

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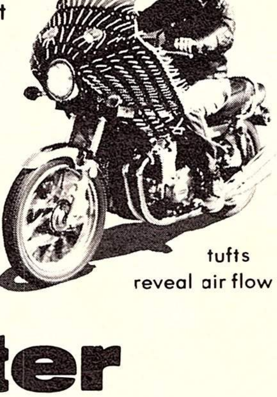

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CIRCLE NO. 50 ON READER SERVICE PAGE.

THE HONDA CR-72

THE PAST AS FUTURE

By Kevin Cameron

● In the last two seasons it has become obvious that the current four-stroke machines in American motorcycle roadracing have no chance against the two-strokes. Some people feel that an unfairness is being perpetrated, and this inequity should be corrected by new rules. But there's another viewpoint. The present one-sided affair in racing is not so much a result of inherent advantages of the two-stroke principle over the four-stroke one as it is of the financial or technological unwillingness of the four-stroke makers to build equipment on a par with the two-strokes.

A close examination of a high quality four-stroke design confirms this view. The CR-72 Honda is one showcase for the innovations created in Honda's rapid rise to international racing glory in the 1960s. The machine is a Honda production racer. It is a 54 x 54 mm, dohc 250 cc twin, giving a claimed power of 40 bhp at 12,000 rpm.

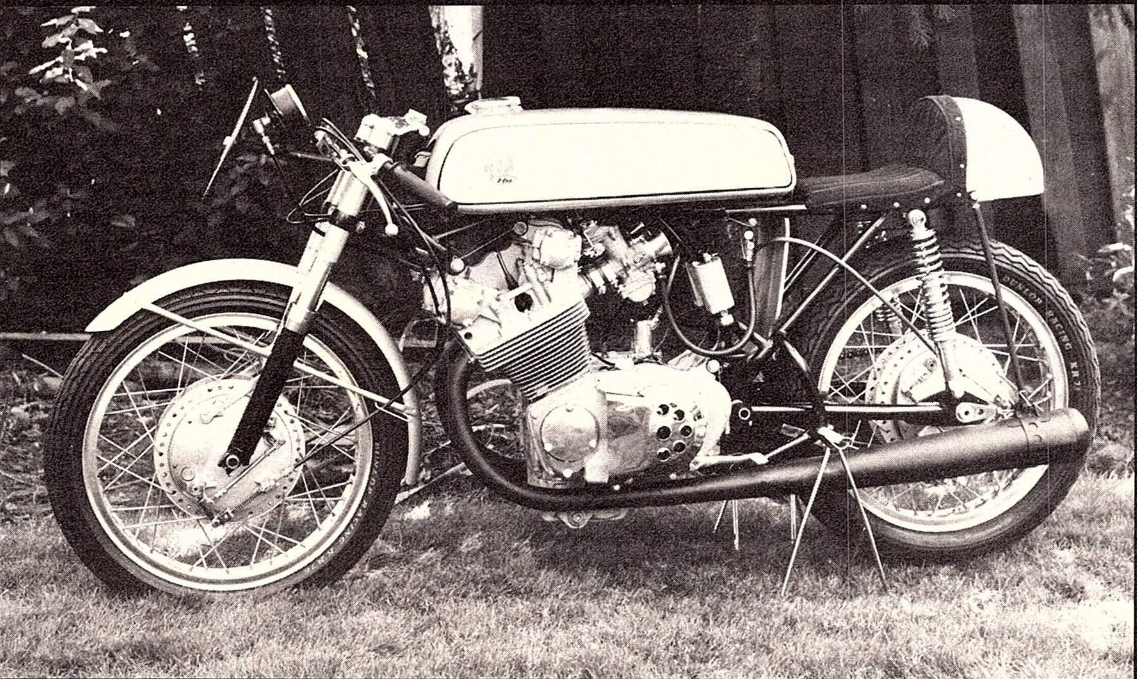
It took Honda three years of trying before they won their first world championship (the 250 in 1961) in international roadracing. But after that, with a dizzying display of mechanical virtuosity, they won again and again with twins, fours, fives, and even a six cylinder machine.

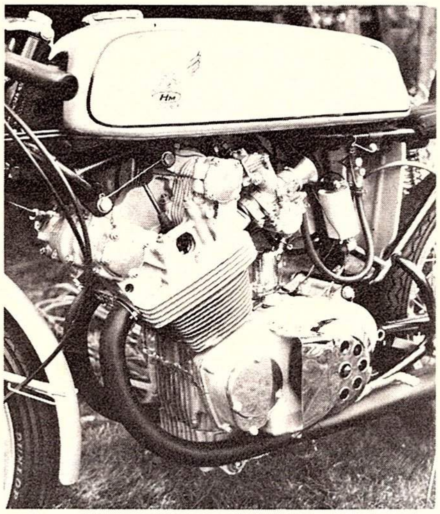
Traditional fans were horrified to see their Italian icons smashed by newcomers, and chauvinistic things were said to the effect that the Honda machines represented nothing new, that they were just refined copies of Gileras, MVs, or Guzzis.

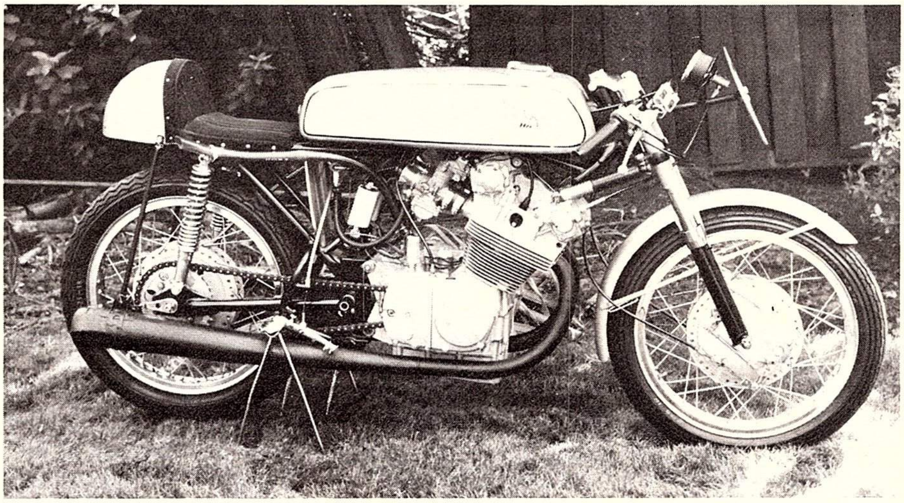
At the same time, a new group of racing aficionados was growing up, who watched the Japanese successes with almost religious awe, who collected every scrap of information about the Honda machines, and who learned the novel magic phrases, *Four valves per cylinder, Eight speed gearbox, Seventeen-thousand rpm.*

A new tradition was created: millions of people learned the Honda name, bought the street machines, and came to believe in the invincibility of Honda's four-stroke engine technology.

I was among those millions. I pored over catalogs and magazines, compiling







notebooks full of statistics, measurements made from pictures, impressions by Honda team riders, anything at all that would help get me closer to knowing *how they did it.*

I even tried to race Honda street machines fashioned into racers, but learned, as so many did, that when Honda means a machine to be a street bike, they are usually right. Racing interested me more than brand loyalty, so I turned away from the Hondas to the new and available Yamaha production racers.

In the early sixties, when Honda success was still new, the company made a number of high rpm, dohc 50 and 125 cc production racers. These made a niche for themselves in club racing, but were well below standard for international racing.

Much smaller numbers of 250 and 305 twin-cylinder production racers were built, supposedly to provide rides for Honda teamsters in non-international events. These were sold to the riders at season's end, and they then filtered into the hands of the public. They weren't a great success. Handling was poor though power was considerable. Parts production for these models ceased in 1965, so it became necessary to "know the right people" to get spares. Gradually the machines dropped out of circulation.

Apart from this, the big CR's can be looked at in another way. Twelve-thousand rpm from a 54 x 54 mm engine translates to 4250 fpm piston speed, a very high figure by any standard.

Forty horsepower from a 250 is ho-hum in this age of 50 bhp Yamaha twins, but consider this: double up this twin into a 500 four and you have 80 bhp, a figure that is almost competitive today. Treble it into a 750, and you have the staggering sum of 120 bhp, a number that our present day "Formula 750" machines have yet been able to reach.

Surely then four-stroke technology is far from dead if a thought-experiment with a ten-year-old design can come up with horsepower that's competitive today.

A six-cylinder 750 would be costly, even if the new rule were adopted, requiring only 25 machines for AMA approval, but one should remember that Benelli is going ahead with plans to market a six-cylinder street machine.

Let's look at the numbers. The formula relating bhp, bmep, rpm, and displacement is:

$$\text{Bhp} = \frac{\text{Bmep x Rpm x Displacement}}{\text{Constant}}$$

If we have 40 bhp at 12,000 from a 250 engine, the bmep (brake mean effective pressure) must be 175 psi. This is a good figure today, but not an outstanding one. The apparent ceiling for unsupercharged four-strokes on gasoline is about 200 psi, the bmep of the current Cosworth GP car engine. (450–460 bhp @ 10,000 rpm from 3000 cc) This car engine is water-cooled, fuel injected, and CDI-sparked, all things that the CR-72 is not.

Therefore you can sée that this is still a very refined piece of hardware, not to be scoffed at in any sense. Someone may point out that Norton's famous Manx engine could come very close to a 200 psi figure in a good example. That's true, but there was a sacrifice made to get it. The Manx has very pronounced "megaphonitis," that narrowness of powerband that comes from heavy dependence on wave action in the inlet and exhaust pipes, on long cam timings, and on large overlap.

The Manx has been around for a long time. Was Honda missing something, or were they working the compromises some other way? Honda's way was a very different one, as we shall see.

Among my notes from that period ten years ago are graphs showing the advances in bmep made by each of the great racing companies, year by year. Honda's "progress report" is unique, because the figures rise, then actually fall! The rise takes place in Honda's early period, from the beginning until their first GP win, as the designers searched out the answers to basic engine problems. This we can understand, but why do the figures drop through the classic years, 1963–1966? Isn't progress supposed to be steady? This brings us to the central point, the basis of Honda's racing design philosophy.

When bmep is raised to the highest possible level, through the use of strong pipe tuning and long valve timing, the torque curve shows the resonance peaks, and becomes steep. Instead of doing this, Honda settled for a somewhat lower bmep in order to get the desirable flat torque curve that makes for a very rideable racing motorcycle. Then how did they get the horsepower back, after "throwing away" bmep? By raising rpm through cylinder multiplication.

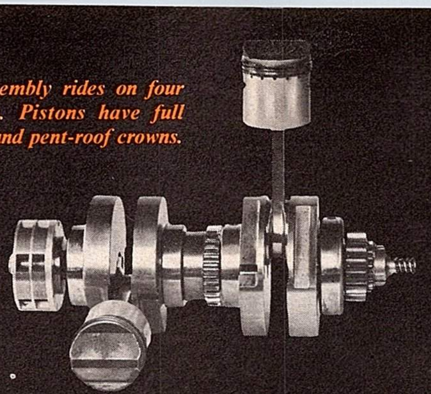
Since peak rpm is roughly limited by stroke length, then if the displacement is held constant, and the number of cylinders is increased, the stroke of each will become shorter, and rpm capability is raised. The final statement of this philosophy was the 250cc six-cylinder racer, capable of some 19,000 rpm and over 60 bhp.

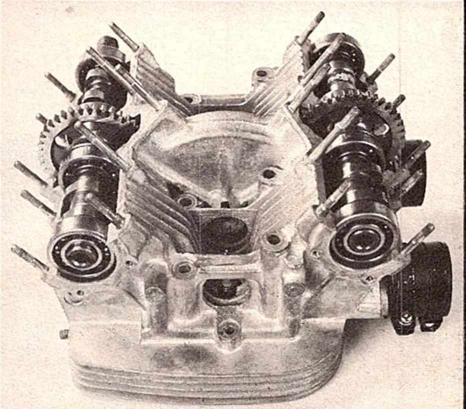
It sounds easy. It wasn't.

Anyone who has worked with racing four-strokes is all too familiar with the problems of high rpm. Piston rings break. Rods stretch and snap. Bearings fail. Valves float and bend. Honda had their work cut out for them, but these were problems of machine design, not gas flow.

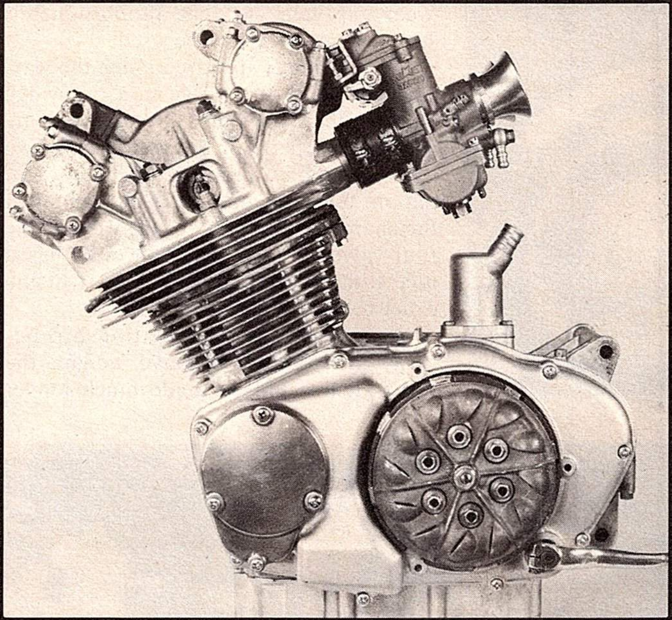
Thinner rings, better materials and designs whittled away the peripheral problems, leaving a classic vicious circle as the

Crankshaft assembly rides on four main bearings. Pistons have full skirts, 3 rings and pent-roof crowns.

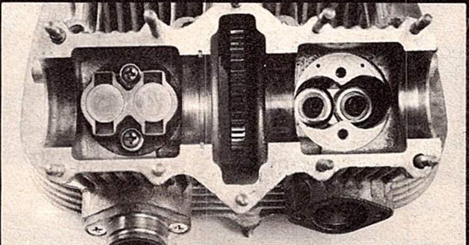




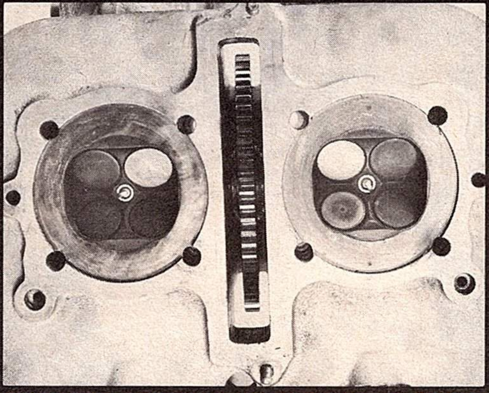
Engine had each camshaft running on four ball bearings. Spur gears drove the two overhead camshafts.



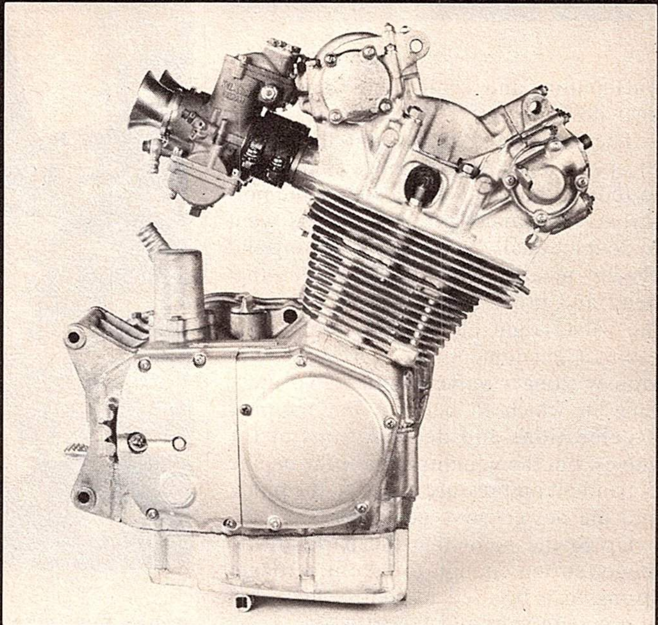
A dry clutch transmitted about 40 hp to a close-ratio six-speed gearbox.



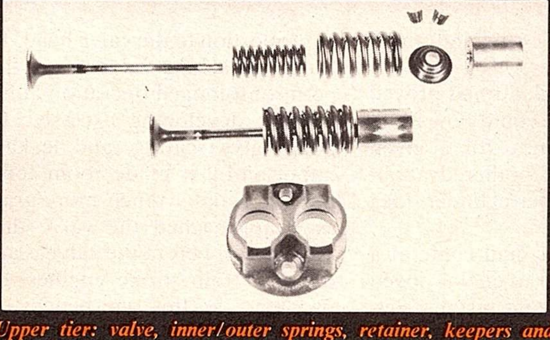
On left two tappets are installed in the guide block. With block removed, valve spring cavity is exposed.



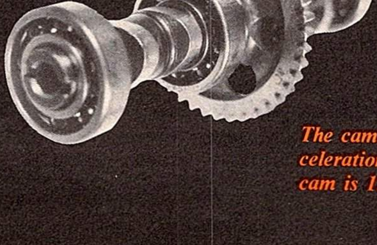
Pistons' view of four-valve heads. Intakes are 23.6mm in diameter while exhausts are 22mm across.



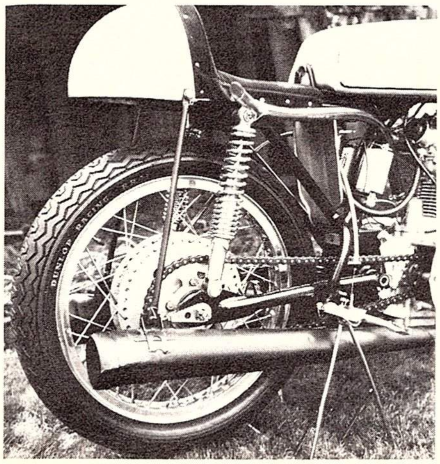
CR-72 racing engines were sand-cast and weigh a hefty 132 lbs.



Upper tier: valve, inner/outer springs, retainer, keepers and tappet. Middle: nested assembly. Lower: block minus tappets.



The camshafts have fat and fast acceleration lobes. Peak acceleration on cam is 1575 Gs.



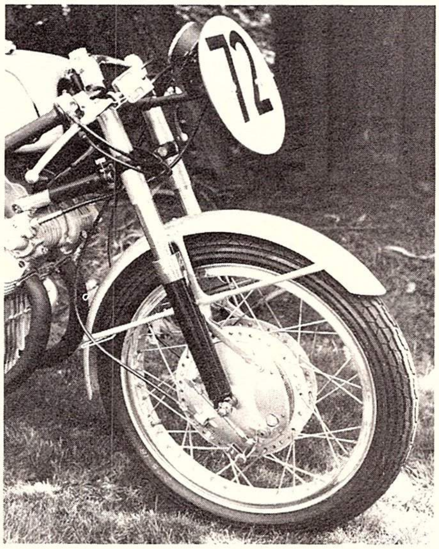
outstanding and central problem—valve gear design.

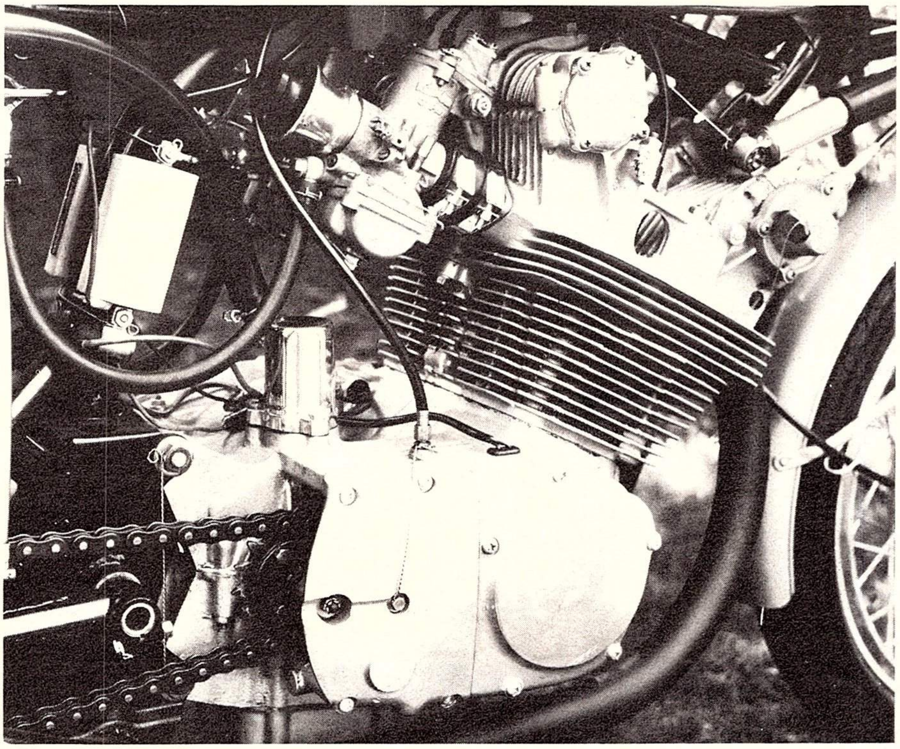
The gas flow people want the valves to open and close as rapidly as possible, to reduce throttling and losses in the port throats. The mechanical engineers want to do it gradually, since rapid opening and closing means violent accelerations that bend and break parts, as well as tossing the valves right off the cam profile—the familiar phenomenon of valve float. Obviously, longer valve timings give more time in which to perform the required accelerations and decelerations of the valves; but these, in turn, make the engine dependent on pressure waves in the pipes, and the power curve gets steeper.

Up to the point that the parts are no longer strong enough to take it, stronger springs can be used to control float, but at a cost in cam and tappet wear.

The first choice was obviously overhead cam operation of the valves, since this did away at one stroke with heavy rocker arms and push rods, but this was by itself no guarantee of success. The MV 500 four of this period was a dohc motor of the latest design, but had only a 300 rpm safety band beyond the power peak, so that the rider had to be a genius with the throttle to prevent destructive valve float.

Constant trouble with valve gear no doubt motivated the Honda development team to look for a complete solution that





would put these troubles behind them once and for all.

Airflow experts in England had proved that one large inlet valve could flow more air than two smaller ones, for a given cylinder size, so no one bothered about the archaic four-valve-per-cylinder idea any more.

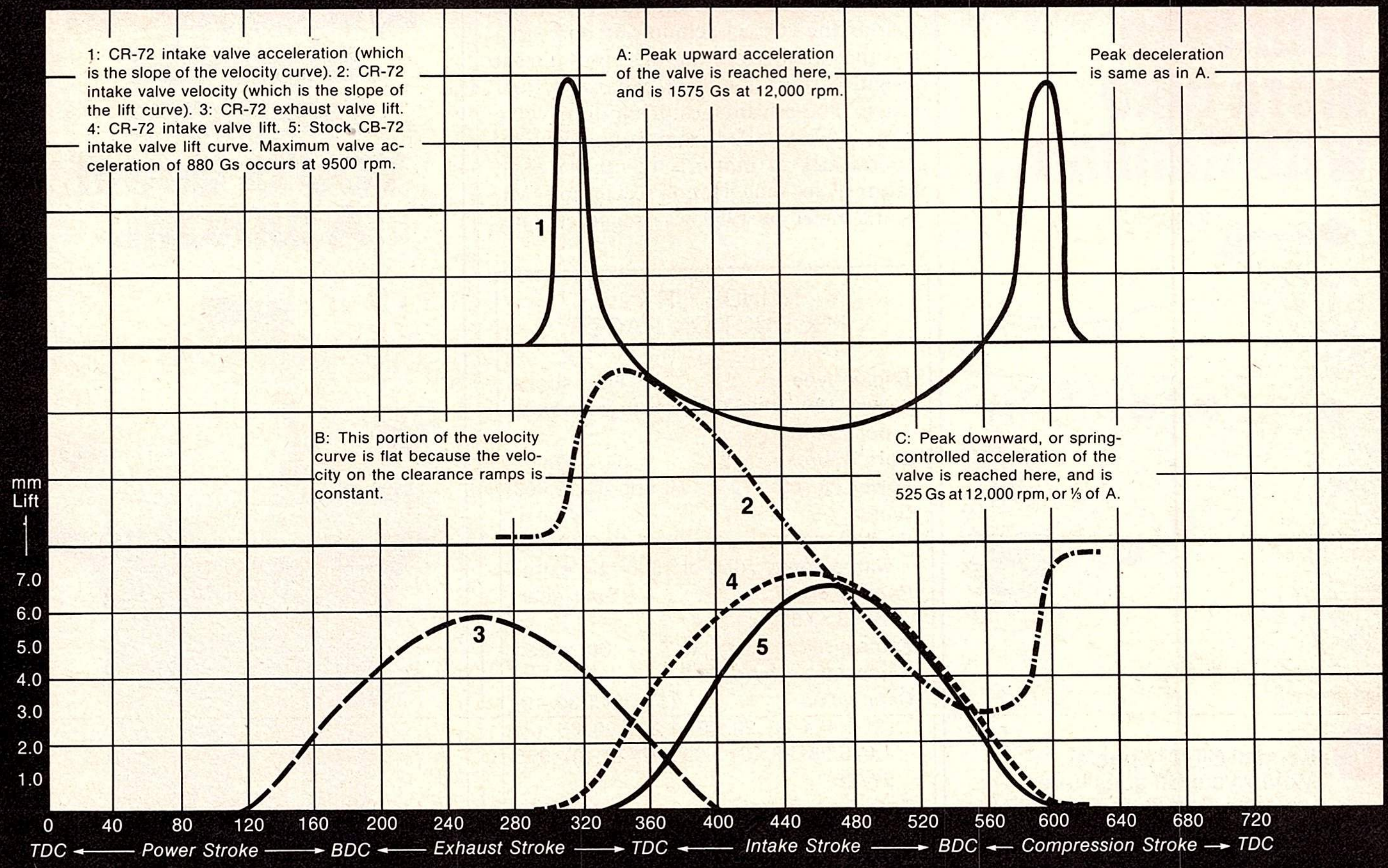
This "proof," however, had come at a time when the chief limit to engine speed was crankshaft bearings and piston rings, so the Honda engineers, already having developed suitable rings and bearings, gave the four-valve idea another look in the light of their new requirements.

It turned out that the reciprocating weight of the two smaller valves was less in proportion to their airflow capacity than that of a single larger valve. A four valve engine might suffer a small loss of breathing efficiency as compared to a highly refined two-valve design, but the extra rpm capability of the four-valve configuration would more than overcome this. The provision of a separate cam lobe and tappet for each valve alleviated the wear problem, so that proportionately heavier springs could be used.

Other benefits appeared along the way. There is no proper place in a two valve head for the spark plug. To equalize flame paths to all parts of the cylinder and so safely use high compression without detonation, the plug must be in the center of the chamber in the way of the valves. The four-valve arrangement, however, has a nice little nest for the plug right in the exact center.

With the improved relationship between flow area and valve weight, the valve stem could be made much longer in proportion to the valve head. This made room for a long valve guide that would permit prolonged operation at high speed without developing excessive clearance, poor valve seating, and leakage. More importantly, it made room for the inlet pipe to make a much more gradual turn as it approached the valve throat. The abrupt turn before the valve is at the heart of many four-stroke engines' low bmep problems, so this one benefit erased the last vestiges of truth from the old "proof" of two valves' superiority to four, and Honda was on its way to its "total solu-

Valve Position, Velocity, and Acceleration



1: CR-72 intake valve acceleration (which is the slope of the velocity curve). 2: CR-72 intake valve velocity (which is the slope of the lift curve). 3: CR-72 exhaust valve lift. 4: CR-72 intake valve lift. 5: Stock CB-72 intake valve lift curve. Maximum valve acceleration of 880 Gs occurs at 9500 rpm.

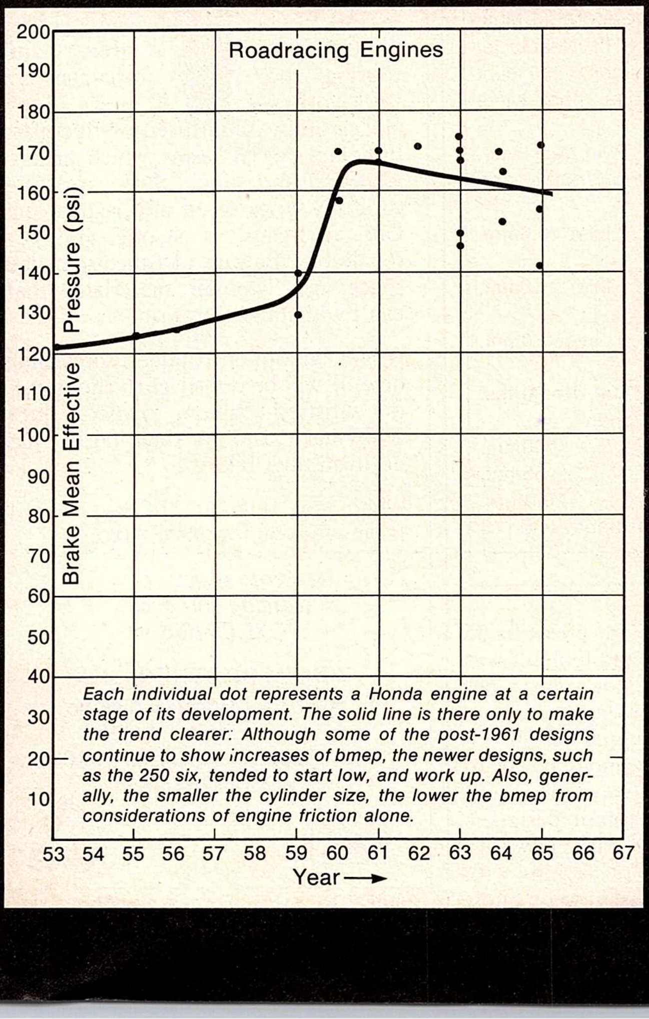
A: Peak upward acceleration of the valve is reached here, and is 1575 Gs at 12,000 rpm.

Peak deceleration is same as in A.

B: This portion of the velocity curve is flat because the velocity on the clearance ramps is constant.

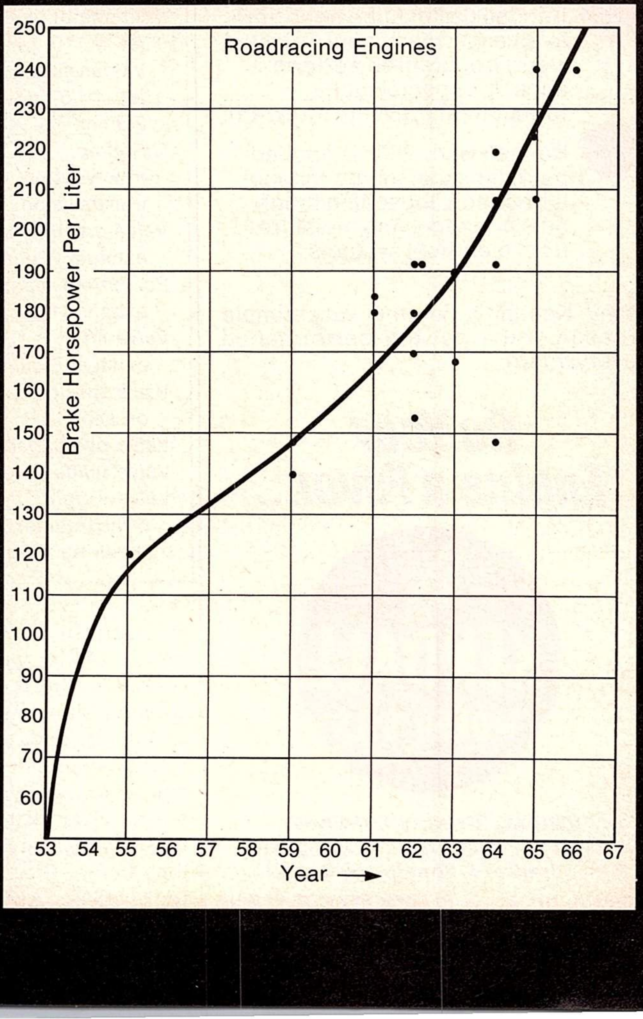
C: Peak downward, or spring-controlled acceleration of the valve is reached here, and is 525 Gs at 12,000 rpm, or ⅓ of A.

BMEP Development 1953-65



Each individual dot represents a Honda engine at a certain stage of its development. The solid line is there only to make the trend clearer: Although some of the post-1961 designs continue to show increases of bmep, the newer designs, such as the 250 six, tended to start low, and work up. Also, generally, the smaller the cylinder size, the lower the bmep from considerations of engine friction alone.

BHP/Liter Development 1953-67



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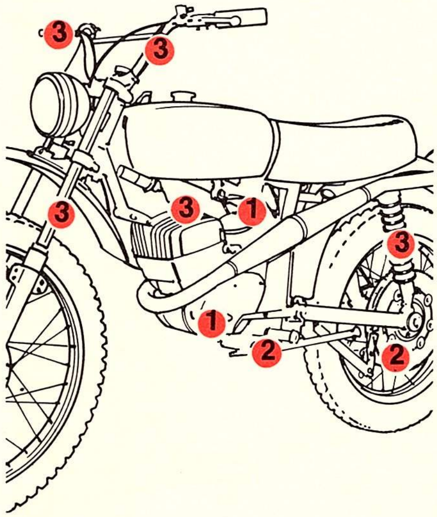

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tion" of the valve gear problem.

Of course, the other engine problems were being worked on at the same time, such as the correct relation of bore area to valve area, cam timings, port throat design, carburetion, and exhaust system design. The advantages of the four-valve layout were masked from public view by general lack of maturity of other design features, so that Honda's winning Mt. Asama racer of 1959 was regarded only as a curiosity in the western press. Its 35 bhp at 14,000 rpm was creditable, it was conceded, but the use of four valves per cylinder showed that the Japanese were still in the dark about engine design.

HONDA CR-72 PRODUCTION RACER

Engine type	Four stroke twin, 180° firing, DOHC with four valves per cylinder.
Bore & stroke	54 x 54mm.
Power @ rpm	40 bhp @ 12,000
Bmep	175 psi.
Powerband	8000–12,000 rpm, with a safety zone of 1500 rpm extra.
Primary drive	Spur gear, 19-63 (3.31:1)
Transmission	Six speed constant mesh
Gear ratios	(1) 1.843 35/19, (2) 1.454 32/22, (3) 1.200 30/35, (4) 1.078 28/26, (5) 1.000 27/27, (6) .965 27/28.
Rpm drop @ upshift	(1) 27%, (2) 21%, (3) 11%, (4) 8%, (5) 4%.
Ignition	Energy transfer magneto, two sets of points, one sparkplug per cylinder.
Carburetion	Two Keihin 29mm smoothbore, dual-cable operated. Main jet #110, jet needle RH3, Needle jet 2.6mm airbleed type, air jet #250, pilot jet #55, cutaway 2mm, float valve 2.5mm.
Oil pump	Twin gear type, low volume, supplying engine and transmission.
Valve diameters	Inlet 23.6mm, exhaust 22.0mm.
Port throat diameters	Inlet 21.0mm, exhaust 18.7mm.
Valve lift	Inlet 7.0mm, exhaust 6.0mm.
Valve springs	Dual, 70–80 lbs. on seat, 120–130 lbs. open.
Valve overall length	100mm.
Valve guide length	55mm.
Valve weight	26.9 gm. (With retainer, keepers, tappet, and 1/3 of spring weight 79.6 gm.)

Two years later, the Hondas began to win repeatedly with four-valve racers and it was clear that the Western designers must be the ones in the dark. It wasn't long before they, too, were working with four valves. At this present day, most

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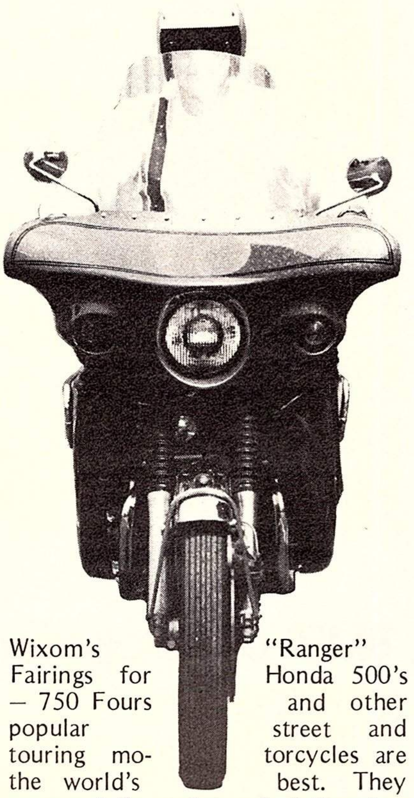

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serious four-stroke racing engines designed as such use the four valve concept.

Finally Honda refined the design to the point that they no longer needed very long cam timings and large overlap. The improved flow characteristics now allowed acceptably high bmep without recourse to strong tuning of the pipes and resultant steep powerband.

By 1965, Honda engineers were ready to deliver a paper before a meeting of the Society of Automotive Engineers, in which they guardedly declared that Honda now had a "design manual" which enabled them to design confidently any size cylinder on paper, then build it and know that it would be close to optimum without development.

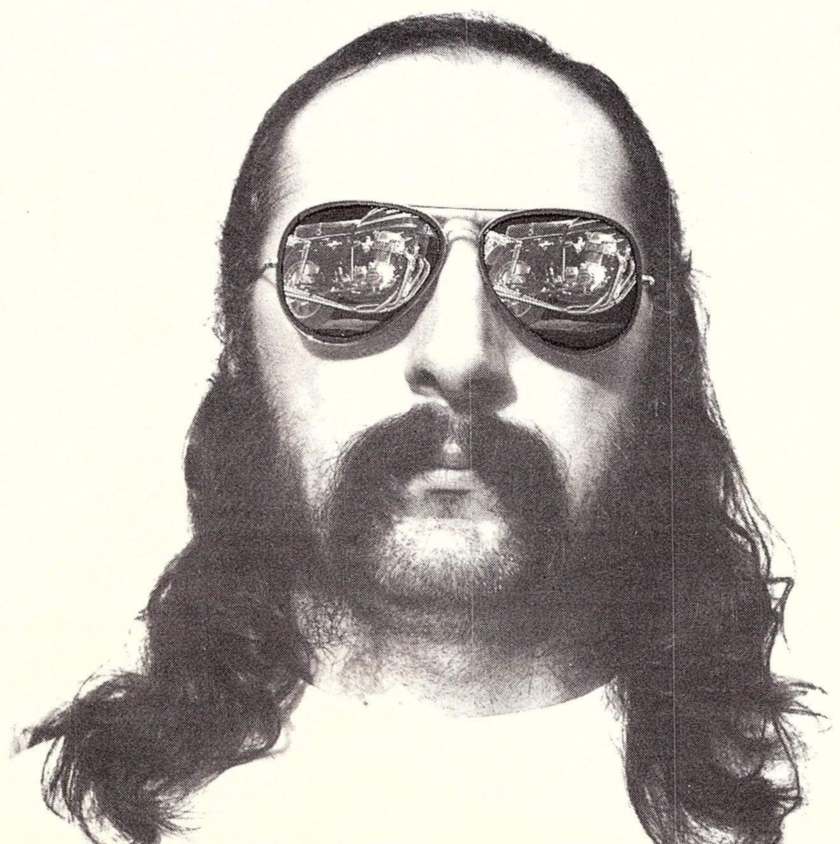
The CR-72 production racer was built with the benefit of all this new knowledge. It has four very long stemmed valves in each cylinder—two 23.6mm inlets and two 22.0mm exhausts. More than half of their 100mm length is supported by bronze valve guides. Each valve is urged to its seat by two nested springs, giving some 120 lbs at full lift, with 75 on the seat. Located above each valve is a cylindrical tappet which, although hollow, is closed on both ends. One end is the flat rubbing surface for the cam lobe to act on, while the other has a small projection that bears against the end of the valve stem. Operating clearance is adjusted by grinding this projection, or by selective assembly, since there are no adjusters to loosen, and no shims to drop out. These tappets are carried in pairs in bronze tappet guide blocks which are screwed in place after the valves and springs have been installed in the cavities below them. Spinning in four special close-clearance ball bearings, the cams are located directly over each set of four tappets, and are driven by a train of straight-cut gears from the crank center.

The valve timing is remarkably short, but there is ample valve area to make up for it. The ratio of piston area to inlet valve area is 2.62. After a 12 inch/sec clearance ramp about 20 degrees long, the inlet valve shows significant lift at about 50 degrees *btdc*, shoots quickly to its full 7.0mm lift, then drops to the closing ramp at about 60 degrees *abdc*.

Valve motion has two significant phases. As the valve is accelerated upward, the accelerating force is provided by the cam. When the valve has reached its maximum upward velocity, there is only the spring to provide the force to slow and stop it at the top of its lift, then start it downward, accelerating it to the maximum closing velocity. In this, the spring-controlled phase, the spring must supply enough excess pressure to keep the valve and its tappet pressed firmly against the cam lobe, preventing valve float. Finally, the cam-controlled phase takes over again to slow and ease the valve onto its seat.

Since the cam draws its power from the

(Continued on page 113)



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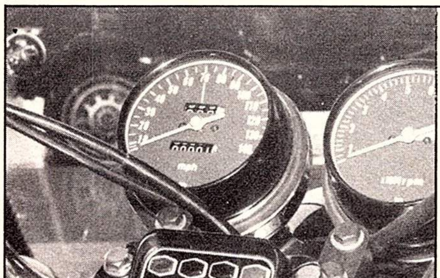

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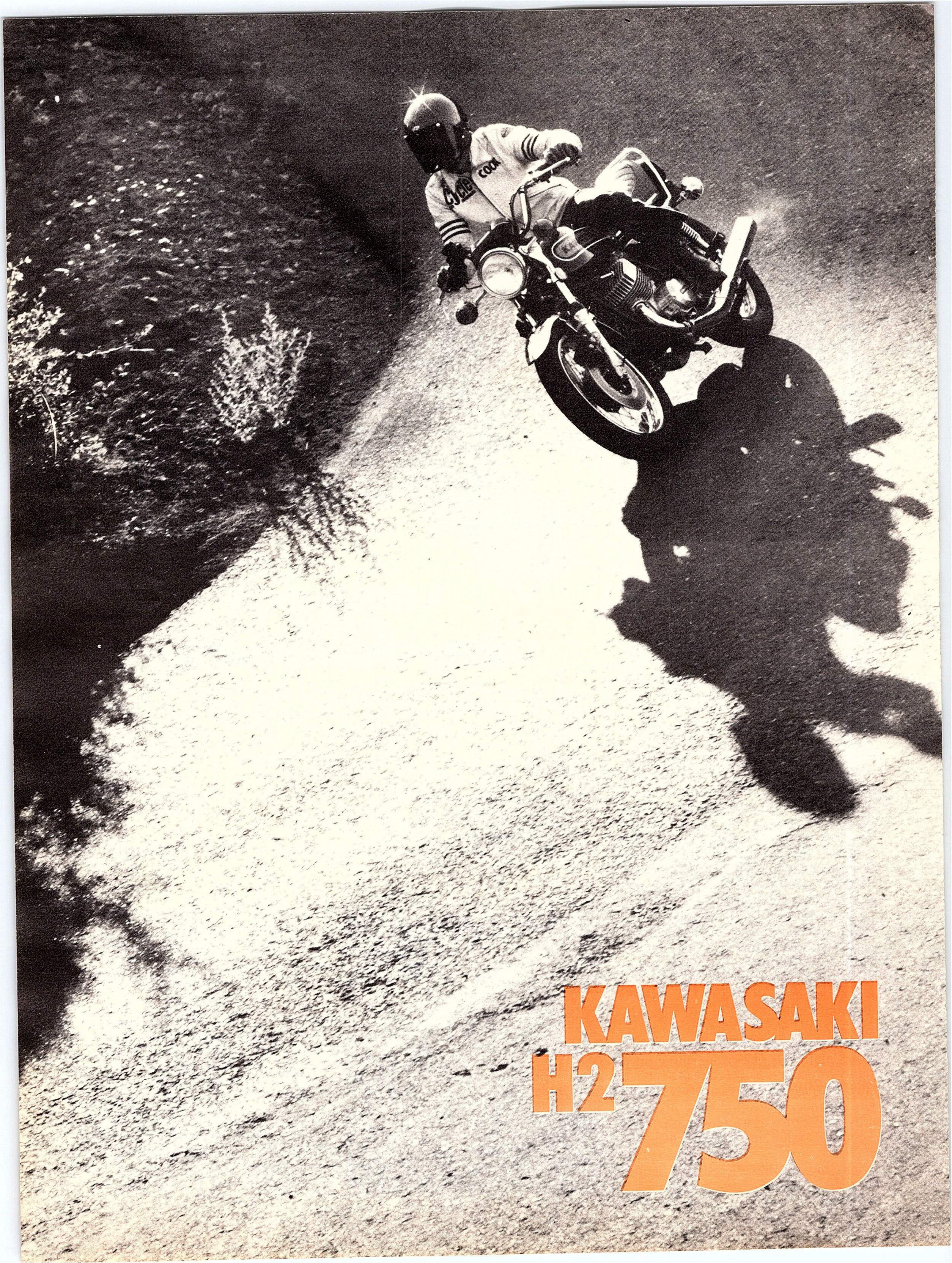


KAWASAKI H2 750

Cycle Test

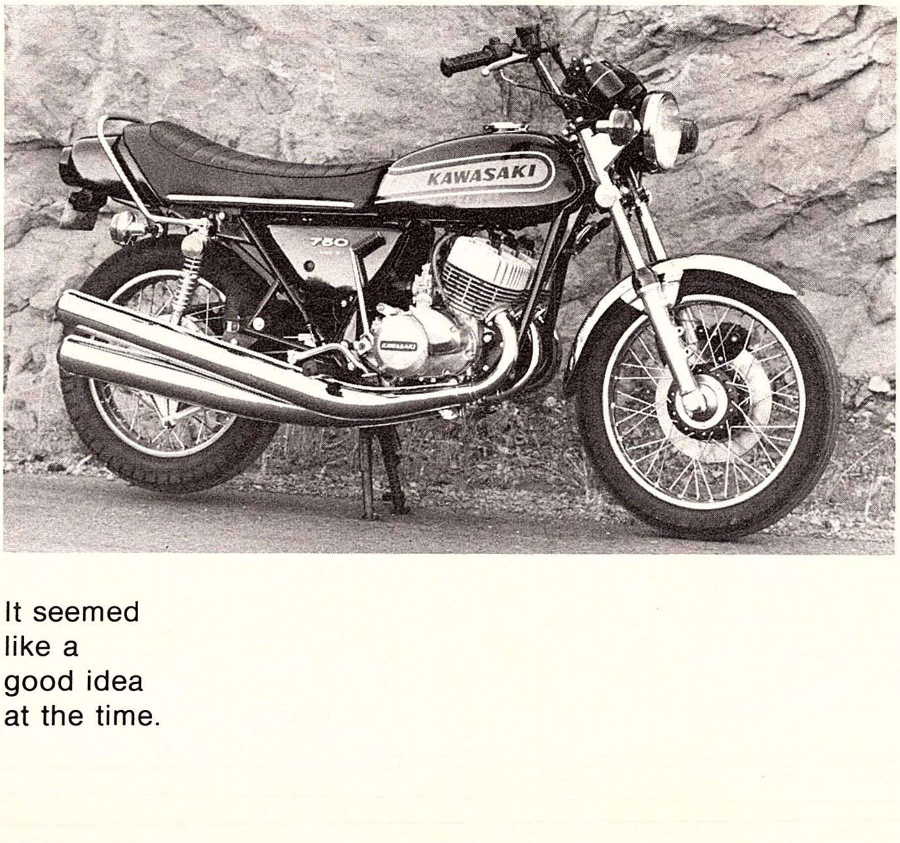
It seemed like a good idea at the time.

● For better and for worse, in every way that counts, Kawasaki's 750 triple is a genuine post-mesozoic dinosaur: uniquely and irrepressibly profligate, magnificently brutish, and irretrievably trapped in an evolutionary *cul-de-sac*. Given the circumstances of its creation the Mach IV could hardly have been anything else, as it assumed form when most of us still believed that general incivility could be justified by straight-line performance if the latter was somehow raised to sheer, eyeball-flattening proportions. We were enchanted with muscle, and our enchantment prompted Kawasaki to attempt building a Superbike to end all Superbikes—which is a fair description of what they did. The Mach IV made us turn toward a more balanced kind of performance, and thus assured the future of machines like the exquisitely contrived Kawasaki Z1. But in doing that we may have moved where the big two-stroke triple cannot follow, the ultimate performer in a world where people no longer worship just performance.

There's a new Mach IV these days, and it has been improved. But for all the change the improvements have worked in its fundamental character they might as well have been giving *tyrannosaurus rex* a shot of underarm deodorant and a flea collar. The problem here is that while the improvements are subtle, the motorcycle is not. Fuel economy has been improved, so you get a solid 26 mpg average instead of the original 23 mpg and the bike still is very far from being a gas-miser. Thirsty it was and thirsty it remains. New mufflers have kept the Mach IV within the statutory noise limits, but only marginally at 86 dB(A) and may have something to do with both the slightly reduced fuel consumption rate and a small reduction in performance. Yes, that's right: the new Mach IV isn't quite as fast as the original—but it still can flatten your eyeballs, so you'd have to say it hasn't really changed in that respect, either. When all's said and done, the Kawasaki Mach IV hasn't been tamed or civilized at all.

At the heart of this motorcycle's obdurate refusal to become truly housebroken is its engine, which has three biggish cylinders all in a relatively wide-spaced row, crankpins spaced 120-degrees apart and porting arranged to give power at speeds where plenty of it is possible. There has been a sufficiency of propaganda telling us that we get smooth, evenly spaced power impulses from a two-stroke triple, and that much is true. It also is true that the layout has a dynamic imbalance, a strong teeter-tottering rocking couple that makes the in-line three a shaker—though not quite as harsh as a vertical twin of the same displacement. So the Mach IV vibrates a lot despite the addition of some bits of rubber in its engine mounts, and it isn't ever going to be as smooth as its smaller three-cylinder brothers because its pistons are bigger and move farther.

PHOTOGRAPHY: BILL DELANEY



The porting? Sure, that could be reworked to improve the Mach IV's willingness to plug along at 1500 rpm in 5th gear, and its ability to make distance on a gallon of gasoline. But such reworking would give you engine characteristics just like those of the water-cooled but otherwise similar Suzuki GT-750—characteristics totally out of keeping with the rest of the Mach IV motorcycle. Port to your heart's content and the Kawasaki isn't going to be magically transformed into a sweet-natured touring floater; all you'd succeed in doing is making the beast turn sullen.

Sullen is the one thing Mach IV definitely is not. Quieted and leaned-down as it is in its latest permutation the bike remains a wheeled rocket. You won't get any big surge yanking the throttles open when the revs are down, but let the tach needle swing past 4000 rpm and the motorcycle turns into pure animal.

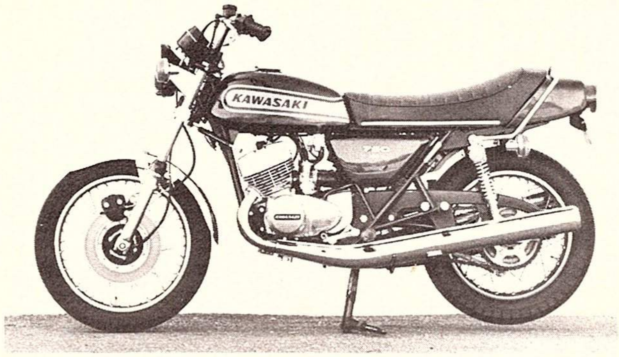
The Mach IV's brakes and tires always have been a fair match for its acceleration; handling in the earlier models left some room for improvement and that has been made, with a fix that doesn't strike us as being overly imaginative but works well just the same. Kawasaki's engineers have taken the easy way and simply lengthened the Mach IV's wheelbase, stretching it from the original 55.5 inches to what our tape-measure says is 57.5 inches with the rear axle centered in its adjustment slots. It was the easy answer, because they did it by making the long swing-arm even longer—the reach from pivot-point to axle now being 21.75 inches.

They had a perfect opportunity to use the currently popular motocrosser's forward-mount shocks, but decided against the novelty and added extensions on the frame's seat rails to move the spring/damper units back with the wheel. They seem also to have stretched the seat a couple of inches in length, which means there now is almost room on the perch for three-up travel. Kawasaki would have done better to widen the seat a bit, as it is high-crowned with padding on the firm side for motorcycle seats, and a little too narrow for the average motorcyclist's seat.

On the other hand, if the new Mach IV's seat was any wider it probably would have to be lowered before any but the tallest of riders could straddle the bike without getting up on tip-toe. One of our test riders has legs with a length in the 98th percentile for American males (by actual measurement at the GM Tech Center, where it was suggested that a motorcyclist also should have his head examined) and even this daddy-long-legs verged on being too short at the fork for the Kawasaki triple. It gives you a very long reach from seat to pavement.

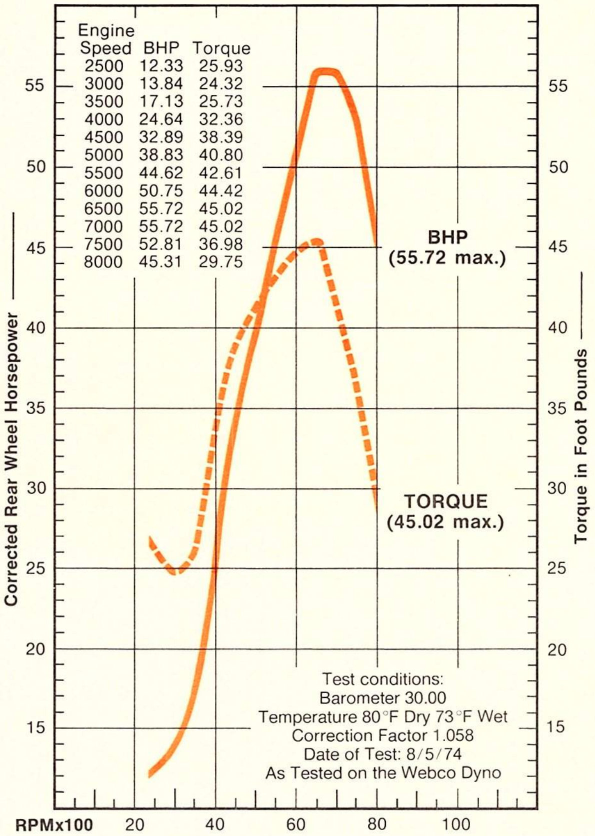
Maybe the tall saddle is a reasonable price to pay for one of the Mach IV's more attractive attributes, which is the unusual amount of cornering clearance it has. Three separate mufflers should get in each other's way; those on the Kawasaki are high enough and tucked in closely enough to be all but undraggable by any half-sane rider. In fact, not even the resident *Cycle* berserker ever flopped the bike down so far as to mar the chrome on the twin right-side pipes, though he did wear off most of the kick-stand extension on the bike's opposite side.

You wouldn't have wanted to try anything fancy in the way of corner-carving with the older Mach IV. While Kawasaki's 750 triple has from the beginning been a miracle of cornering stability as compared with the infamous center-hinged 500, it would at times do some, well, *funny* little tricks just to keep you alert. There always was a sense of impending trouble about the original 750's handling: a tendency to do a waver-verging-on-wobble in middling fast corners; a vague, rubbery feeling that would discourage the prudent rider from trying to use all the side-clearance and tire adhesion. Some traces of that behavior are discernable even in the new long-wheelbase bike, but at a much subdued level, and without the somewhat frightening undertones. Unfortunately, though the latest Mach IV won't put a lot of energy into tickling your scare gland neither will it offer you much help in keeping itself aimed. The front wheel tracks all right at higher speeds; it can't seem to make up its mind in slower corners—sometimes falling into the curve



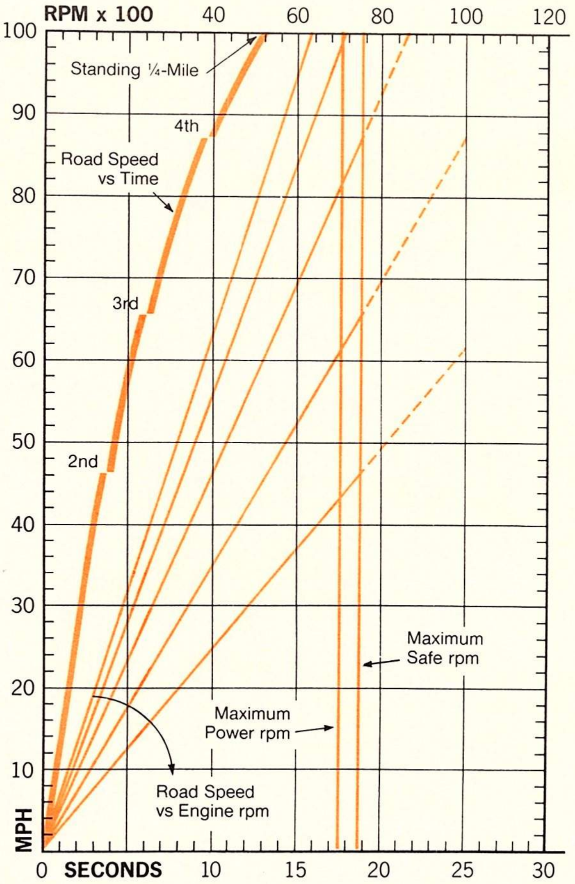
KAWASAKI H2 (MACH IV)

Price, suggested retail	$1825
Tire, front	3.25 H-19 Dunlop Gold Seal
rear	4.00 H-18 Dunlop Gold Seal
Brake, front	disc, 1.63 x 11.65 in. x 2
rear	drum, 1.4 x 7.9 in.
Brake swept area	131.8 sq. in.
Specific brake loading	4.94 lb./sq. in.
Engine type	Three-cylinder, two-stroke, piston-port
Bore and stroke	2.80 x 2.48 in. (71 x 63mm)
Piston displacement	45.63 cu. in. (748cc)
Compression ratio	7.0:1
Carburetion	3; 30mm Mikuni
Air filtration	Synthetic felt
Ignition	Capacitor discharge
Bhp @ rpm	
Torque @ rpm	
Rake/Trail	26.5°/4.3 in.
Mph/1000 rpm, top gear	15.9
Fuel capacity	4.5 gal.
Oil capacity	2.1 qt.
Transmission oil capacity	1.5 qt.
Battery	12v; 6ah
Gear ratios, overall	(1) 12.77 (2) 8.64 (3) 6.53 (4) 5.41 (5) 4.76
Primary transmission	straight-cut gear
Secondary transmission	⅜ x ⅝ chain
Wheelbase	57.5
Seat height	33.2
Ground clearance	7.5
Curb weight	486
Test weight	651
Instruments	speedometer, tachometer, trip-meter
Sound level (California Standard)	86 db(A)
Standing start ¼-mile	13.096 sec., 100.33 mph
Top speed	115 mph
Average fuel consumption	26.4 mpg
Speedometer error	indicated 30 = 27.83 mph indicated 55 = 51.04 mph
Braking force (actual)	.907 G



Engine Speed	BHP	Torque
2500	12.33	25.93
3000	13.84	24.32
3500	17.13	25.73
4000	24.64	32.36
4500	32.89	38.39
5000	38.83	40.80
5500	44.62	42.61
6000	50.75	44.42
6500	55.72	45.02
7000	55.72	45.02
7500	52.81	36.98
8000	45.31	29.75

Test conditions:
Barometer 30.00
Temperature 80°F Dry 73°F Wet
Correction Factor 1.058
Date of Test: 8/5/74
As Tested on the Webco Dyno



and sometimes needing to be pulled into position. There's definitely something for the man holding the handlebars to do when the bike rounds your average street corner, and it's seldom the same thing from one slow corner to the next. We think maybe this uncertainty is linked to the combination of a high CG, long wheelbase and a steering axis that is remarkably vertical in a bike having the Kawasaki's size and speed. Our inclinometer shows the steering rake to be only 26.5-degrees and that's about 2-degrees less than the big-bike normal.

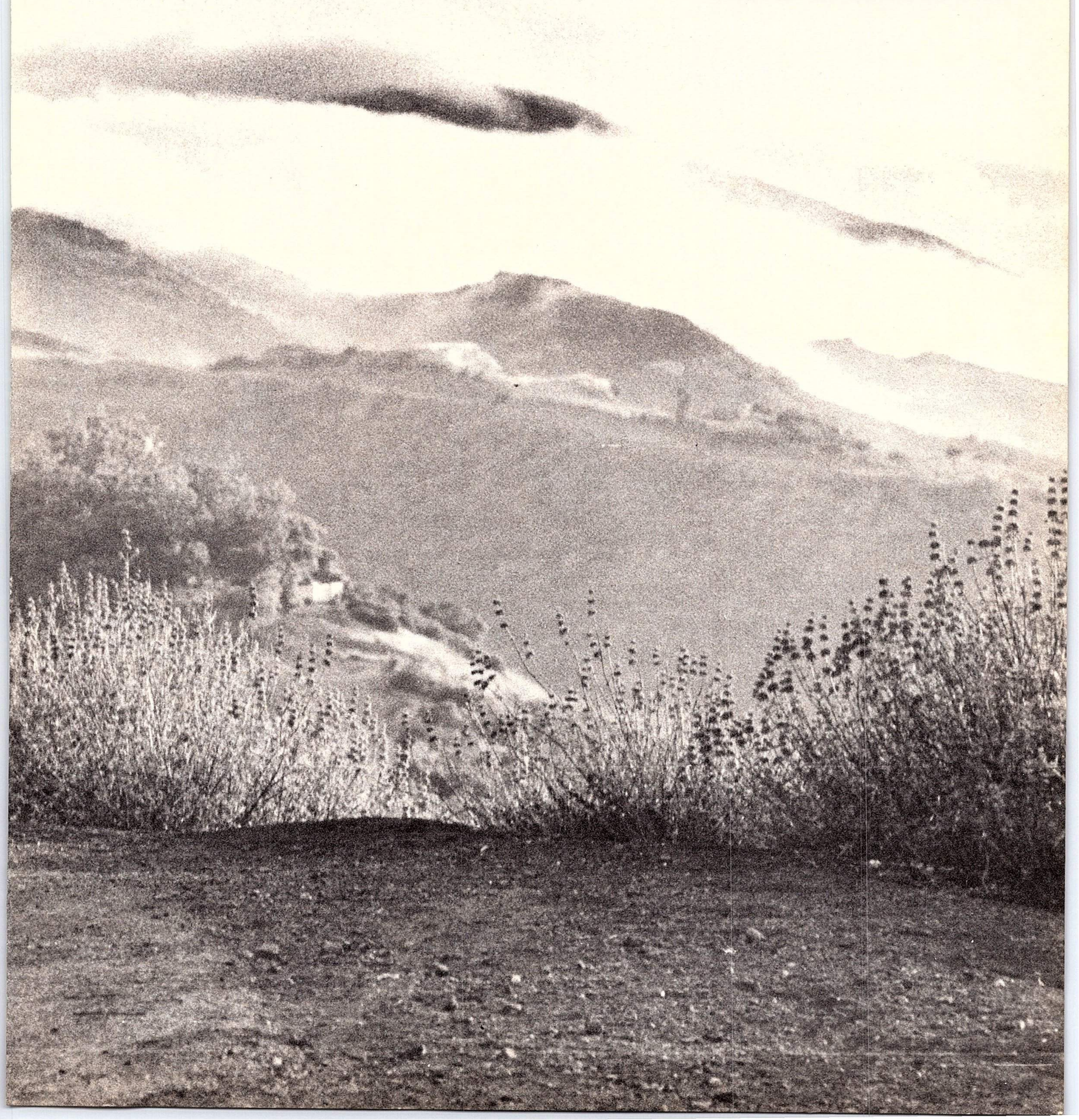
Kawasaki was a pioneer in capacitor discharge ignition systems for motorcycle engines, and that's what they're using to this day on the Mach IV—with excellent results. For some reason known only to itself the engine never would want to start on the first kick, but it seldom needed more than two and didn't demand that they be especially vigorous. Perhaps it was all due to the demand-type regulator in the fuel valve under the tank, which is open only when the engine is running and automatically closes to prevent crankcase flooding when the bike is parked for the night. In any case it was very agreeable about starting on the second kick and would thereafter idle for what seemed likely to continue for hours without a trace of plug fouling, which is where the trick ignition system makes itself useful. It goes without saying that the bike also may be idled along in traffic without any show

of choking on its accumulating oil.

It is good that the Mach IV will idle without stalling, because you wouldn't want to restart the thing very often. Not that the kick-start lever takes much muscle to spin the engine; the difficulty is that the whole business is damnably awkward. The lever is long and its cranked end is very high in the air, moving even higher if you tilt the bike over against its side stand for the starting operation, which will make the situation even worse because the side prop is short, the tilt is extreme and you find yourself almost kicking sideways. The alternative is to stand on the bike's right side and kick with your left foot, but then the height of the lever is such that you have to raise your kicking foot up to about belt level, holding it out a couple of feet and kicking inward toward your opposite knee. You can do your kicking from astride the Kawasaki, of course, but then the bike's top-heaviness makes it want to fall over and you still have the problem of raising your foot high enough to reach the crank. Oh yes, and you also have to fold the right footpeg out of the way and then try to avoid getting it stuck up your pant's leg while you do the rest of the routine.

Your problems with the kick-start lever are not entirely ended when the engine is running, because once you're on the move, whizzing along enjoying the way scenery hurries past, you will discover that

(Continued on page 117)



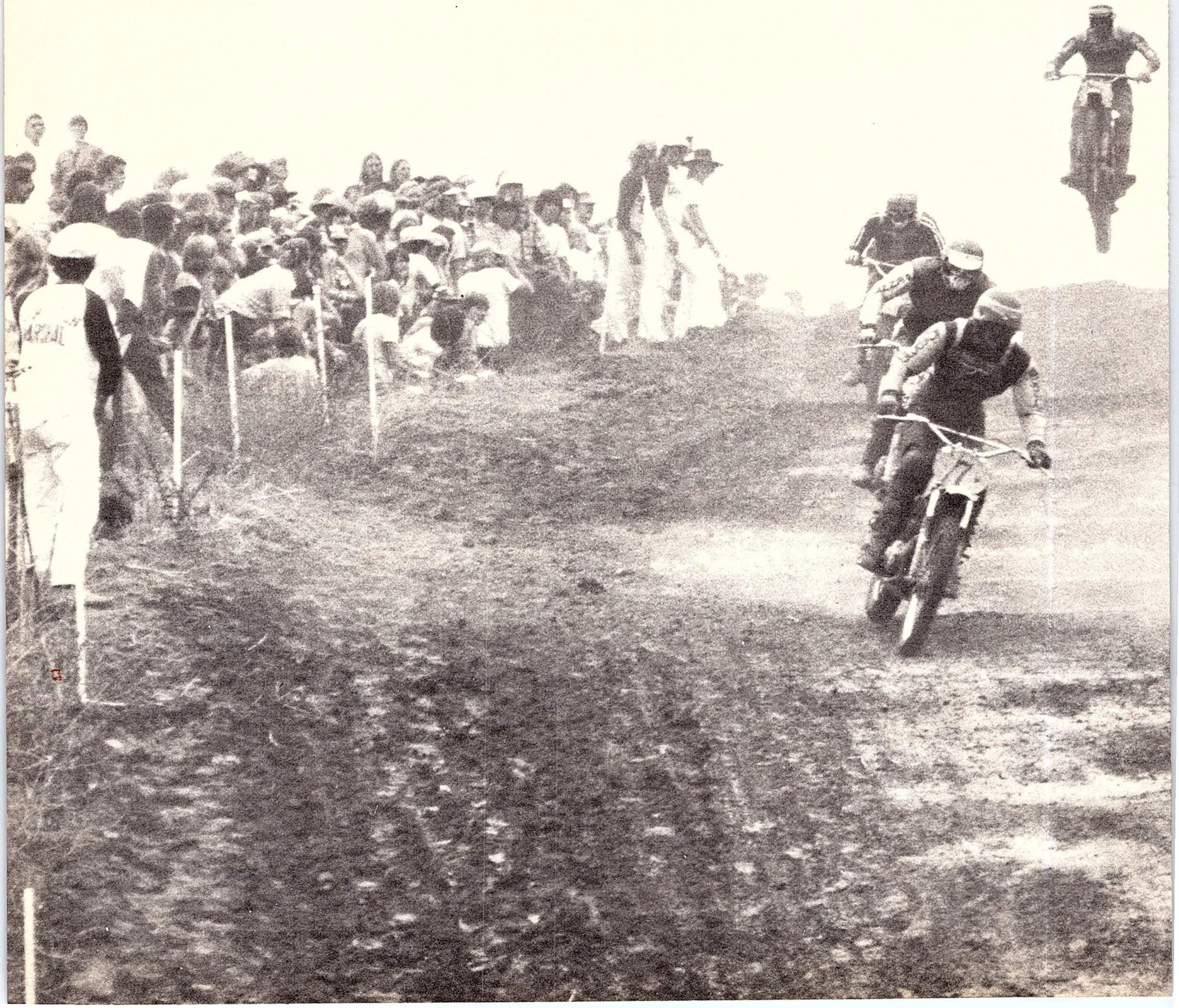
United States Motocross Grand Prix

Once again the Americans got caught with their push-ups down.

By John Huetter

● "Only firsts count now," admitted Roger DeCoster, current and three-time World Motocross Champion, as he stood with the other GP riders to receive checks from AMA motocross referee, John "Light Brown" Lancione. It was three hours after the last checkered flag waved ending the U.S. Grand Prix. Roger was satisfied, if not completely relaxed. He still had a chance to earn an unprecedented fourth World Championship in a row. But, as he said, all that mattered from this point on was who could finish the most Grand Prix motos in first: he or his arch-rival for the title, Heikki Mikkola, a fanatic Finn riding for the Husqvarna factory. Heikki could have wrapped up his first World Championship by winning Carlsbad, but he didn't. In fact, Roger improved his standings against Heikki, who began the season by winning the first three grand prix events outright. Now with three rounds left to go, it only matters who wins each one. No seconds, no thirds.

Under the new FIM scoring system for World Championships, only the best 12 finishes out of the 22 grand prix motos count toward the title. DeCoster came to



the U.S. with four wins and two seconds; Mikkola had seven wins and two seconds.

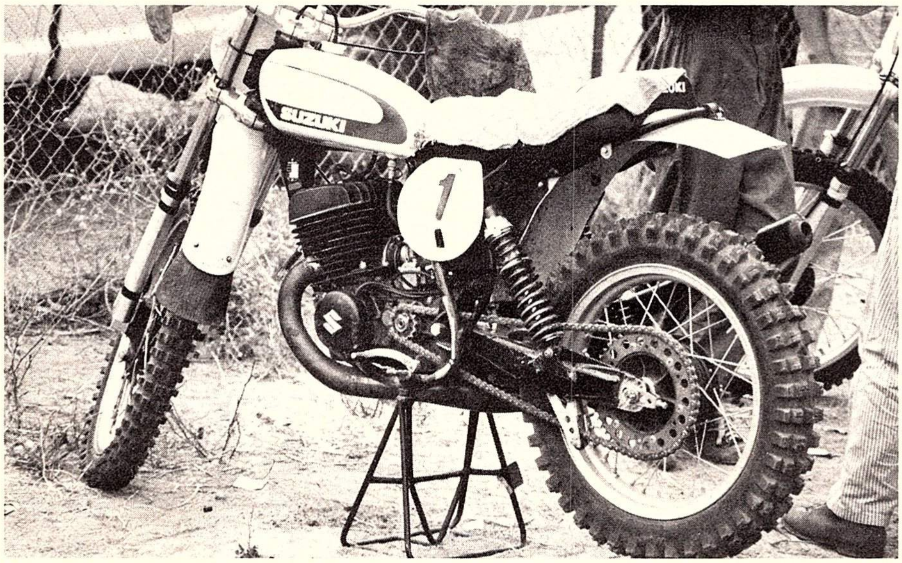
The two contenders for the highest position in 500cc motocross are almost painfully dissimilar. And it is likely that it will be the personalities as much as the pure riding skill that will determine who is the 500 World Champion this year. DeCoster: cool, calculating, experienced, and skilled. Mikkola: fierce, hungry, experienced, and also skilled.

"The factory maybe started too late making this year's bike. Now it is the best for most courses but at the beginning of the season, maybe not," Roger believes. "Five times I have broken while I was leading a race. Five times." What Roger is suggesting is that had he not broken, he would be in the lead and cruising home. If he could have *stayed* in the lead for the full 40 minutes plus two laps of those five motos. Still, lack of machine reliability has hurt him so far this year.

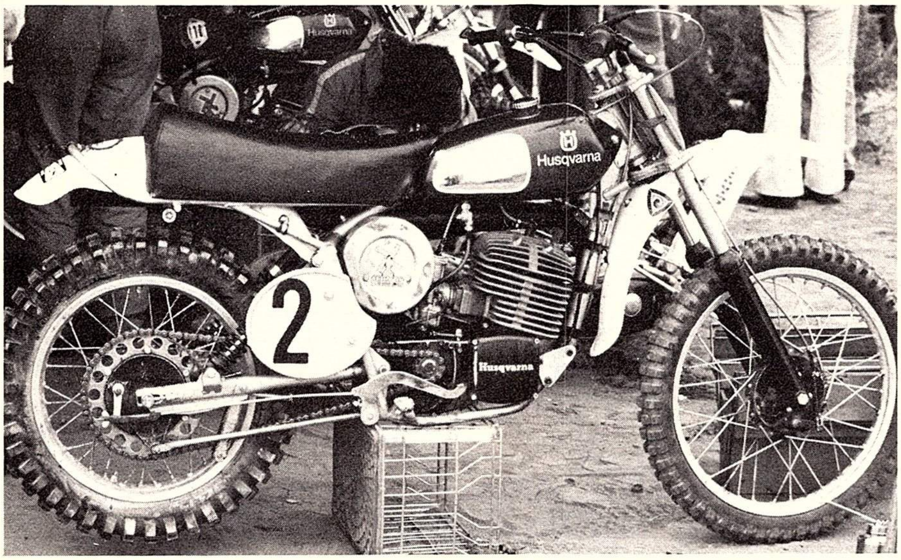
Mikkola is more terse. "Bike is good. I am ready hundred per cent." As many grand prix riders have discovered, that can be a hard combination to beat: 360 works Husqvarna and the incredible strength, speed, and dogged tenacity of Heikki Mikkola. This Finn can resume racing in a grand prix half a lap down after, say, a first turn pile-up and be running fourth by the end of the moto. He doesn't just pass other riders; he devours them.

Even DeCoster is intimidated by his strength. Mikkola knows that Roger has beaten everybody who has come against him; sometimes easily, sometimes narrowly, but won in the end. Roger's approach to motocross is more cerebral. DeCoster will find and use the best lines on a course, then continue to use them

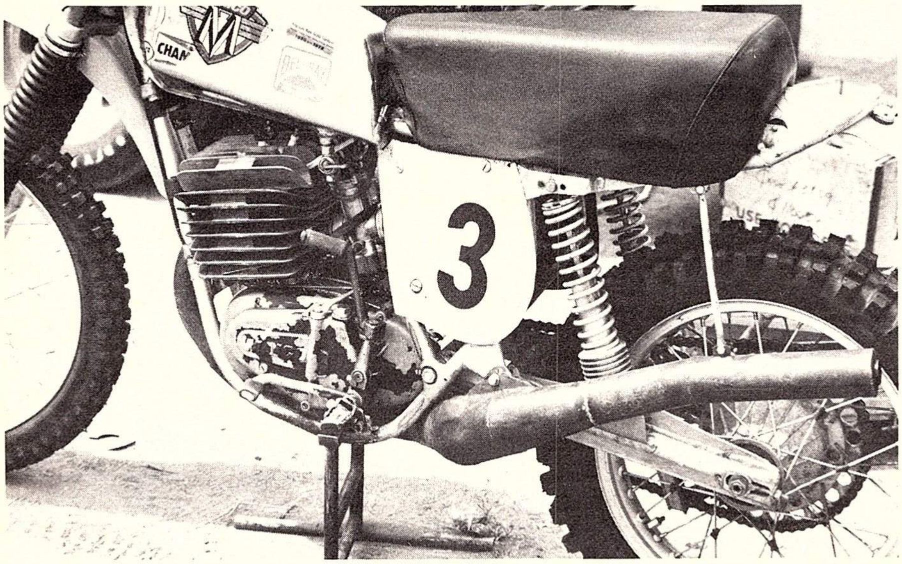
PHOTOGRAPHY: DALE BOLLER, BILL DELANEY



Roger DeCoster's world championship 370cc works Suzuki features upside down front-mount gas/oil shocks with dual springs of differing weights. Nothing about the bike resembles Suzuki stockers.



Even more radical forward-mount shocks are seen on Heikki Mikkola's new 360cc Husky which has a reed valve, radial head, left-side shifting and less weight than the 400s available to the public.



Willi Bauer's works Maico looks like it needs to be restored. Wear comes from hard riding and battering truck rides around the GP circuit. Maico's racer closely resembles their production bikes.

with time-eroding regularity. Heikki might be all over the place on the front wheel but will somehow manage to keep upright—going fast. DeCoster hardly ever makes an error, and it may be that when Roger's RN Suzukis are running spot on, he is plainly *the* fastest.

It looked like either of them could win the U.S. Grand Prix. If you ventured that the Dutchman, Gerrit Wolsink, was due for an overall victory—and would very likely win the U.S. round—most people would respond, "Who's that?"

"That's my problem," smiles Gerrit. "My style is not too spectacular and nobody sees where my positions are." It's true that unless you are following the racing at a grand prix or, last year, one of the American Trans-AMA events very attentively, Gerrit is almost invisible on a motocross track. He is smooth, controlled, unruffled, almost placid in the way he guides his 400 Suzuki (last year, his 400 Maico) around even the roughest circuit. Gerrit graduated from dental school in Holland over a year ago but delayed going into practice as a dentist in order to race World Championship motocross. In the American social ethic, it would be unthinkable to give up dental practice to ride motorcycles. But in Central Europe, it is thought to be a very reasonable thing for a 26-year-old young man to do, particularly if he has a factory ride. Besides, there's much more social status, prestige, and money attached to being a Grand Prix factory rider than being a dentist.

Gerrit did take home maximum points from the U.S. GP, whether anybody had heard of him or not, just like he pulled a shocker by winning the first 500 GP of last season. He had nearly won the German 500 GP; would have, except that German Adolf Weil's illegal start was not disallowed. He was in position to win the British GP just the week before when his suspension did him in. Wolsink was really due for a win.

He favors the stock TM-400 engine in his first year with Suzuki. He has lowered the compression ratio, fitted a slightly smaller Mikuni carburetor to match and that's about it. There is a works expansion chamber attached to it, of course. Gerrit even started out with a stock TM-400 frame, then cut and lowered it and reworked the suspension to suit himself. He

DeCoster passed Mikkola to close the GP point gap as thousands gestured their approval.

PENNZOIL
SUZU
1
2

Wolsink leaped the unleapable 12-foot drop on the last lap to save a win.

claims to be quite pleased with the bike. There's little doubt that the TM-400 engine gives him enough power.

Brad Lackey set fast time in qualifying for start position. "Fast time" is important as a psych-out device in addition to getting your first choice of spots at the start gate. Brad has been doing well in grand prix events most of the season, especially as he has gotten used to his new Husqvarna ride. Huskys, even one-off factory Huskys, are very different motocross bikes to ride and Brad fell off a lot at the beginning of the season. He stopped doing that and subsequently worked his way up to tenth in the World Championship standings, including some impressive placings in the top five. He has twice before set fast time at a GP. Brad is very close-mouthed about his racing and would never admit it, but he wanted very much to do well in the U.S. 500 Grand Prix. Since he'd been the only American rider in any of the 500 World Championship rounds so far this year, there was good reason to believe he'd be first among the larger American entry in the U.S. round. In the first 45-minute moto, he was.

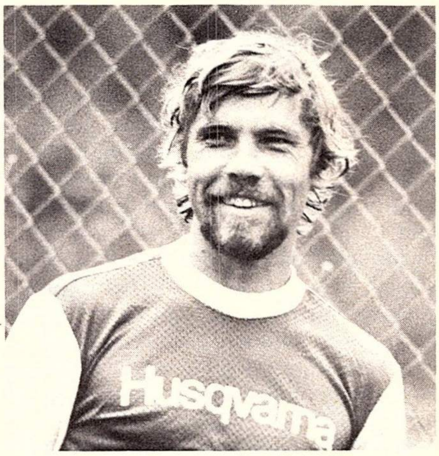
Thirty-seven racers assembled behind the steel start gate with a generous representation from the host country. Americans making their only 500 GP appearance of the season included National 500 Champ, Pierre Karsmakers, semi-privateer John DeSoto, U.S. Husky riders Marty Tripes and Gary Semics, Bryar Holcomb for Bultaco and Rex Staten as Honda's token entry.

Also lined up behind everybody else was Jim Pomeroy, normally riding for GP points in the 250 Class, now mounted on a 360 prepared by a local Bultaco shop. Jim was not allowed to race for prize money or first-American honors. F.I.M. regulations prohibited this because Jim is contesting the 250 class world championship. He didn't let that keep him from working up to eighth from the second row before his carb fell off in the first moto, or finishing fifth and first American in the second moto, just behind Pierre Karsmakers, who was first overall AMA motocross licensee in the U.S. 500 Grand Prix.

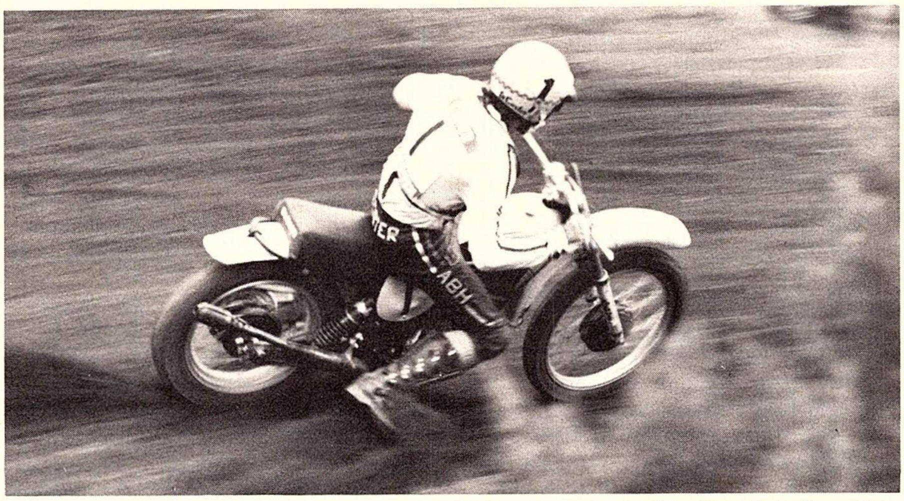
The first turn at Carlsbad is barely 100 meters (the FIM minimum) from the start gate. It is also a 180-degree left-hander that is narrow, with room for maybe six bikes abreast. American Gary Semics led

Gerrit Wolsink, a 26-year-old dentist from the Netherlands, won the USGP overall on a Suzuki.

Heikki Mikkola of Finland and his 360 Husky are the hottest items on the GP circuit this year.



Brad Lackey, Husqvarna, is still the fastest native American in the international MX scene.



DeCoster clearly had the most endurance and was fastest until a broken front hub slowed him.

Tim Hart zaps a berm in a dry section. The two-mile course was half wet clay, half dry dirt.

into it and out of it, getting an incredibly good holeshot. Behind him everybody fought for the one or two good lines. About eight of the riders, almost all of Team Yamaha including Karsmakers, tangled and crashed into the damp adobe dirt. Both DeCoster and Mikkola avoided the pile up but lost positions avoiding the flying bikes and bodies.

Semics' lead lasted about two laps, then Gerrit Wolsink motored by from second as spectators frantically searched their programs to see who was leading.

A surprising John Banks and an even more surprising Bryar Holcomb were running third and fourth during the opening laps. They were both, it turned out, on the sick list and retired by the halfway point. It was hard to tell if Banks' pre-race pallor was due to sickness or British weather, but he talked about having chicken pox recently and still had a touch of flu. Bryar had a blue hole in the bottom of a swollen foot and thought he had blood poisoning from the puncture wound. Banks didn't come out of the pits for the second moto. Neither did Holcomb. John was later looking for someone to buy his works CCM 498cc four-stroke motocrosser. Bryar just looked unhappy.

Wolsink built up a lead of 8–10 seconds and looked uncatchable, riding quickly and smoothly, until DeCoster got out of the pack and broke clear into second place. What became obvious after 20 minutes of the first moto was who *really* raced. The hometown holeshot artist, the 15-minute moto specialists, the riders putting in an obligatory ride for their sponsor all seemed to drop out of sight as the more possessed GP works riders got down to serious breadwinning business.

Brad Lackey worked his way determinedly up to third behind Wolsink and DeCoster, as high as he had finished in any grand prix this year. Behind him were Adolf Weil, Jaak Van Velthoven, Heikki Mikkola, Bengt Aberg, Ake Jonsson and, providing another surprise, American wunderkind Marty Tripes. The signs from Marty's pit proclaimed, "Go, Porky!" and the naturally talented California teenager displayed his uncanny, but sporadic, strength and agility. He passed Lackey and Adolf Weil, who were engaged in very tight nose-to-tail racing on the next-to-last lap. Then he ran over his own ankle on the last lap and didn't finish the moto.

DeCoster whittled away at Gerrit's once-comfortable lead, passed the Dutchman and built up a gap of equal proportion in his favor. Both works Suzuki engines stayed on song but Gerrit could not engage second, third, or fourth gears on the first, and sometimes second, try. This accounted, in part, for the ease with which Roger eventually passed Wolsink to get under the checkered flag first.

Heikki Mikkola's mechanic, Pella Persson, was experimenting with some new two-ply and three-ply rear knobby tires—very light—to further reduce unsprung weight and give improved track "feel." Heikki had run on the two-ply tire in setting second fastest qualifying time and liked the way it felt in practice. The course was still damp and fairly soft in the gray, humid morning. But Pella knew that the track would dry out and get much harder, even during the first moto. He had raced in Southern California before. His recommendation was to change to at least the prototype three-ply tire, maybe even the standard four-ply Trelleborg. Heikki said no. Heikki's tire went flat with two laps to go in the first moto.

Both he and Van Velthoven had gotten by Lackey, but when the tire went, big Jaak slipped into third place and Brad closed to within striking distance in the last laps.

Lackey took the checkered as first American in the moto but only made about four laps on the 360 Husqvarna in the second race before both wheels started coming apart, ending any hope of a first overall American placing and the lucrative contingency fund that went with that position. He had required two novacaine injections for the pain in his right ankle before the race.

Current 500 National Motocross Champion, Pierre Karsmakers: a Dutchman by birth, a Californian by residence, is a controversial figure in international motocross. The initial furor surrounding Karsmakers was touched off when Pierre took out an AMA motocross competition license last year and then proceeded to waltz off with the National Championship in the 500cc class by soundly trouncing all the U.S.A. riders.

Many of his former cohorts on the international circuit considered him a cherry-picker for abandoning the more serious, hard-fought Continental competition in favor of easier American events. Many Americans felt the same way. Through it all, he remains a good, constantly improving, Yamaha factory contract rider. Pierre continues to demonstrate that he's a lot better than many of the Europeans thought and a lot better than most of the Americans are.

The second moto was Gerrit Wolsink's show from the crowded first turn to the high drama of the finish. His gearbox was fixed and he used it efficiently to stay ahead of DeCoster, then Karsmakers, who had quickly passed Roger and even closed some on Gerrit. The first three were circulating very fast, virtually in a race of their own. Wolsink was unruffled and intense: Pierre, not seeming to go fast, up on the pegs most of the time; Roger hunched over the bars and typically very, very stylish.

Moto 1

Rider	Country	Brand	Points
1. Roger DeCoster	Belgium	SUZ	15
2. Gerrit Wolsink	Netherlands	SUZ	12
3. Jaak Van Velthoven	Belgium	YAM	10
4. Heikki Mikkola	Finland	HUS	8
5. Brad Lackey	Calif.	HUS	6
6. Pierre Karsmakers	Calif.	YAM	5
7. Adolf Weil	W. Germany	MAI	4
8. Bengt Aberg	Sweden	BUL	3
9. Ake Jonsson	Sweden	YAM	2
10. Jim Weinert	Calif.	KAW	1

Moto 2

Rider	Country	Brand	Points
1. Gerrit Wolsink	Netherlands	SUZ	15
2. Heikki Mikkola	Finland	HUS	12
3. Roger DeCoster	Belgium	SUZ	10
4. Pierre Karsmakers	Calif.	YAM	8
5. Jaak Van Velthoven	Belgium	YAM	6
6. Adolf Weil	W. Germany	MAI	5
7. Jim Weinert	Calif.	KAW	4
8. Marty Tripes	Calif.	HUS	3
9. Willi Bauer	W. Germany	MAI	2
10. Bengt Aberg	Sweden	BUL	1

Wolsink, DeCoster and Mikkola were the first three overall based on points from both motos.

Jim Pomeroy placed fifth in the second moto, but since he competes in the 250cc GP circuit, he was ineligible to collect points at Carlsbad.

Back a distance, Jim Weinert and Jim Pomeroy scrapped for a while over fourth with the decision going to Pomeroy. Heikki Mikkola finally got untracked and came up to add to the front-running action. It's not certain whether Heikki ignores other riders as he cuts a path through the pack, or stalks them, waiting for the precise moment to swat them out of the way like an annoyance that has been keeping him from doing something he badly wants to do, like win. Heikki went by Pomeroy and a fading Weinert, who both still maintained good position. (Pomeroy would finish fifth but would be bumped from the results since he is an FIM 250cc class rider, and this was a 500cc Grand Prix.)

Mikkola was in luck. Roger's riding style changed radically and careful scrutiny of man and machine revealed the reason for his rear-wheel landings and slow approaches to corners. The front wheel was coming apart. DeCoster could not use the stopping techniques necessary to improve his position coming into corners because he couldn't use the front brake. Still, Roger felt that Pierre, running in second, was blocking him.

Finally, Karsmakers decided he couldn't race at front-running competitive speeds with a faulty gearbox and pulled over to let Roger by. But Mikkola had worked up to within a few bike-lengths of the Suzuki's rear tire and he shot past on the inside too, relegating Pierre to fourth at the finish. Mikkola's aggressive charge and a right-running Husky carried him past DeCoster, who was hanging on, trying to finish the moto before the front wheel collapsed.

Wolsink was tiring a little; everybody was after nearly 90 minutes of World Championship motocross. He still seemed to have a sufficient cushion with two laps to go to hold onto the lead and his first GP win of the season. Mikkola had other plans and most of them were put into effect on the last lap of the Grand Prix. He closed to within less than a bike length of Wolsink inside of a minute. Gerrit kept closing the gate in corners, keeping the strong Finn from getting a wheel completely under him. Just before the finish line on the Carlsbad course is a 12-foot dropoff that is near-vertical. At the base is a high-bermed lefthander followed by a slippery right-hand runout into the dirt bank where the man with the checkered flag stands.

Wolsink was halfway down the dropoff as Mikkola's front wheel left the lip. They hit bottom almost together but Heikki had the inside line, enabling him to keep the throttle on, hit the berm faster, come off it faster and, he had to be thinking, cut off Wolsink by aiming straight at the opposite bank forcing Gerrit into a dead-end, nowhere line.

But Gerrit turned inside Mikkola where there was no berm. Whatever gear the Suzuki was in (he thought it was third) was the one he used to scream into the dirt bank full on, the throttle completely to the stop. He slammed the bike into the bank while the flagman waved and jumped back as both man and machine cartwheeled across the finish line. When Gerrit separated from his tumbling bike, the advantage over Mikkola looked to be the space of a front wheel and a gas tank. DeCoster came across third.

Gerrit Wolsink sat ignored, sipping Gatorade on the bumper of his rental car after his first grand prix win of 1974. He was hungry and eating a sandwich hurt his bleeding tongue. He had bitten it when he cracked his chin on the handlebars at the finish line. There has not been a more dramatic finish to a grand prix event this year, nor one so close that counted for as much as this U.S. round. Yet only Chesny Nilsson sat with Gerrit, offering him a cold, wet towel in the still-muggy July heat. DeCoster was the one who was mobbed, at the other end of the pits.

Gerrit only smiles reflectively when accused of being a racing intellectual. (He is also the organizing force behind and president of the Grand Prix Riders Association.) He rubs his painful chin and he knows that he can win Grands Prix.

Mikkola sits hot and unhappy in his pits. He is aware of the opportunity now lost, even though he has retained a narrow 10-point lead in the World Championship standings. The second place finish did him little good. He already has all the seconds he can use. Only firsts count now. ◉

BAJA *Continued from page 64*

elapsed times indicated, Bakken was underrating his opponent.

After the 30 mile route down into Valle de Trinidad both riders posted exactly the same time—38.00 minutes. So only 1.2 seconds still separated the two. Into checkpoint seven, the last checking station before the finish, Bakken gained only minutely and had 58.8 seconds on Robinson after that 70 mile stretch. Heading for the finish Robinson clouted a rock, which threw him off the road and slowed him ever so slightly less than two miles from Ensenada. On the final 35 miles of the road Bakken went 1.2 seconds quicker than Robinson, giving him exactly a one minute lead over the unexpected and near-flawless ride by the privateer team.

In the not-so-close 250 race the sure winners on the Penton team blew their 14-minute lead over the factory Elsinore when Bob Messer unloaded WFO. He bent the handlebars and forks and broke the light in addition to hurting his hand and foot. The two teams were close on time at check seven but Holladay unreeled the Honda into a four-minutes-quicker final section to get the class win 3.07 minutes ahead of the Penton.

The 125cc race was a runaway victory for the factory Husky. Nilsson and Quade finished 31.07 minutes ahead of second place, a privateer on another Husky. Surprisingly all four of the 125 Huskies that started finished, two of them Claes Nilson-prepared.

Both the Mayes/Bakken and Sterner/Robinson teams beat out the first four wheeler in an impressive overall victory for motorcycles. The margin was a solid 4½ minutes. Ironically, the first five overall finishers are motorcycle champions. First car (third overall) was piloted by Bobby Ferro, winner of the famous 200 mile Check Chase Hare & Hound a few years back on a Triumph twin. The second car (fifth overall) was piloted by Malcolm Smith, winner of Baja on a bike and ISDT multi-Gold medalist, and his motorcycle racer-dentist neighbor Bud Feldcamp. Third (seventh) was the team of Mike Patrick and Phil Bowers, winner of both the Mint 400 (overall) and Baja 1000 on a motorcycle. They were all in single seat buggies.

Sadly, a tragic accident involving Parnelli Jones and Bill Stroppe in their infamous Bronco led to their early retirement. A dizzy American spectator fatally met head-on with Parnelli as the former rode, knowingly, backwards on the course from the first check on a motorcycle. The accident was so violent that Stroppe withdrew their entry on the spot. Had they continued at the pace they were maintaining (approximately 80 mph) Parnelli probably would have taken overall honors handily. It was a rotten break for the man everyone acknowledges as the fastest racer in Baja, regardless of vehicle.

The very basis of Baja racing is the ability of anybody, sponsored or not, to go down and lock horns with the world's best off-road racers—whether on two or four wheels. A rider doesn't need any professional license, special permission, approved vehicle, trick engine, secret tires, million dollar pits, magnesium equipment or any other heavenly approval to go race seriously or for fun. It's not an environment that rewards or even tolerates folly, but it's a home for any competent motorcycle dirt racer.

The chances of privateers winning are still slim—Husky, i.e. Claes Nilsson, has the handle on winning the big Baja races. Of the 19 Open class finishers 11 were on Huskies. The first eight places went to 400 Huskies. All of the three class winners were factory sponsored machines. But all the second place finishers were privateers, two from the same Competition Cycle motorcycle dealer. Because of Yamaha's great contingency award program (first Yamaha finisher in each class gets $500) the third place 125 and 250 and the eleventh place open bike finishers divided up $1500. In the case of the 125 and 250 Yamaha finishers they took home more winnings than the second place riders.

Al Baker and Steve Holladay on the other hand were quite well compensated for their effort. They won a total of $2118 (prize and contingency monies) and this amount was matched by their sponsor American Honda. They took home the second biggest total winnings of any of the motorcycle crowd, $4236.

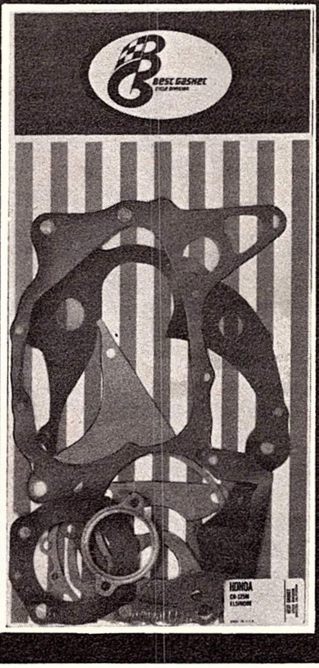
The race, the SCORE Baja Internacional, was probably the best run, smoothest and most controlled of any of the big Baja races in years. It was a tremendous success for Mickey Thompson and the SCORE affiliates. If they decide to run the Baja 1000 in place of the bungling Mexican politicians it could easily draw 500 entrants and the biggest purse ever in off-road racing—maybe a quarter of a million dollars counting contingency awards. The success of this race has been like a transfusion to a dying patient. Baja is back. ◉

BAJA INTERNACIONAL

Overall Winner—Mitch Mayes/A.C. Bakken—Husky 400

Rider Team	Bike	Time	SCORE Purse	Cont. Money
Class #20—0-125cc 19 Entries—13 Finishers				
Nilsson/Quade	Husky 125	8h59.99m	$1120	$1325
Jasper/Padilla	Husky 125	9h31.06m	635	225
Kirker/Roeseller	Yam 123	9h31.30m	392	525
Holbert/Holbert	Pent. 125	9h39.65m	327	---
Ward/Ward	Husky 125	10h10.25m	242	---
Eddy	Yam 125	10h36.75m	84	---
Class #21—126-250cc 13 Entries—11 Finishers				
Baker/Holladay	Honda 250	8h32.87m	$ 893	$1225
Adent/Messer	Pent. 250	8h35.94m	558	150
Bilkey/McCallister	Yam 250	8h54.28m	357	525
Bartlett/Bartlett	Pent. 250	9h14.49m	301	---
Lujean/Ley	Honda 250	9h21.97m	123	---
Class #22—251cc-Open 29 Entries—19 Finishers				
Mayes/Bakken	Husky 400	8h07.41m	$2030	$2825
Robinson/Sterner	Husky 400	8h08.41m	964	225
Utsey/Grossi	Husky 400	8h22.17m	600	25
Ussery/Vick	Husky 400	8h56.27m	451	---
Laca/Mason	Husky 400	8h56.49m	375	---
Bishop/Hansen	Husky 400	8h56.68m	330	---
Harper/Hodges	Husky 400	9h02.12m	223	---
Shipley/Shipley	Husky 400	9h30.49m	102	---

ALL GASKETS ARE NOT CREATED EQUAL!



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We're not called *Best Gasket* for nothing. It happens to be a fact that for over 40 years we have made perhaps the world's finest gaskets. In a motorcycle engine that means something. High temperatures, powerful compression and tall rpm stress factors quickly wear out ordinary motorcycle gaskets... while *Best Gaskets* keep going strong.

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CIRCLE NO. 49 ON READER SERVICE PAGE.

OWNER'S MANUAL
KAWASAKI
KZ 400
KAWASAKI
DOHC 400

CIRCLE NO. 29 ON READER SERVICE PAGE.

SUNDAY, 11:03 PM. Frank can't sleep. He's thinking about his new Kawasaki, his first motorcycle. Frank gets out of bed. Elaine wakes up. "What's the matter?" she says.

"Can't sleep, I think I'm hungry," he says. "Guess I'll get a glass of milk or something."

Frank clumps down to the kitchen, opens and closes the refrigerator door (to make it sound good), tip-toes to the garage, turns on the light, puts on his helmet, climbs aboard his KZ-400.

"Okay, baby" he says to his bike, "tomorrow it's another world. Vrrrrrrrroooooom... vroooooooooom to work... vroom, vrrrrrrrrrrroooooom through all that vroom crummy, crawlin' traffic... urrrrrroooom, urrrrrrrrrrrrrrom... Okay, stoplight comin' up... disc brake, perfect... urroom, moom, moom, moom... Yeah and there's a guy leanin' outta his car eyeballin' my bike. 'What's it got?' he says. '4-stroke, twin cylinder, 398cc,' I say. 'How's it kick over?' he says. 'Electric starter' I say. And the light's green and vrrrrrroooooom I'm gone... vrrroooom, zippin' across town, easin' around a corner, urrrrroooom, shiftin' down, yeah through all five gears... 'Hi, toots, vrrrrrroooooooom, mum, mum, vrrrooo..."

CLICK.

Frank hears the garage door open. He grabs his owner's manual. He studies it intently.

"Vrrroooom, vrrroooom," says Elaine.

Kawasaki
lets the good times roll.

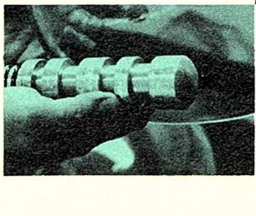
Good times include riding safely. We recommend wearing a helmet and eye protection, keeping lights on and checking local laws before you ride. See Yellow Pages for nearest Kawasaki dealer. Member Motorcycle Industry Council.

Polycarbonate and Fiberglass Make One Great, New Helmet- The Cannonball by Wheels of Man

Important advances in technology are like that. One morning it all made sense . . . put the two plastics everybody argues about together and make one great helmet, the Cannonball.

Until now there's been plenty to argue about. Fiberglass spreads shock better than polycarbonate. Polycarbonate rates ahead of Fiberglass in resistance to penetration. Together, the two plastics give you the best of both worlds. Isn't this what you want in head protection? The Cannonball safety helmet in full coverage and full face models. Your Wheels of Man dealer has 'em or send $1 for full color catalog.

Cannonball Helmets — Colors: Silver, Gold, White. Sizes: S, M, L. Full coverage and full face....................$49.95 and $59.95



CANNONBALL TEST — A specially designed cannon hurls a project 100 miles per hour — many times Z 90 requirements — and fails to penetrate the Cannonball safety helmet.

America's Finest Rider Accessories

CIRCLE NO. 54 ON READER SERVICE PAGE.

WHEELS OF MAN

subsidiary of The Parker Pen Company
16622 W. Rogers Dr., New Berlin, Wis. 53151

BASICS *Continued from page 38*

crankshaft, because such engines require only a trickle of oil delivered at extremely low pressure. The Kawasaki Z1 engine, for example, will show only 2.8 pounds/square inch with its oil warmed to 140°F. Few of the available oil pressure gauges would respond to such a low-level stimulus; the best of gauges would provide substantially some-none information and you get that from a warning light. Unfortunately, while the majority of motorcycle engines would be satisfactorily served by a pressure light, many do not have them.

And then there are the bikes with oil warning lights that might better have a pressure gauge. Hondas Fours fall into this category, because they have plain-bearing cranks and those main and rod inserts need a lot of oil delivered at high pressure. The workshop manual for CB750s says their pressure-relief valves should be set to provide 57 psi with the oil temperature at 176°F. and engine speed at 4000 rpm. This is fairly typical for plain-bearing motorcycle engines, all of which have relief valves and run oil gallery pressures around 45-65 psi. Of course oil changes its viscosity very considerably with temperature, so the readings you'd get would be high on a cold morning and drop somewhat below specifications on a hot summer day—even with a perfectly healthy engine.

In most instances oil pressure readings really are nothing more than second-hand reflections of oil temperature, so anyone planning to fit a motorcycle with just one extra instrument should go for the thermometer. Or maybe they shouldn't because what they learn may send them off in search of an oil cooler. Don't be too eager to insert a radiator into your bike's oiling system: the oil should be fairly hot, 175-180°F., to prevent fuel and water dilution, and to reduce mechanical losses arising from viscous shear. Engines will run very comfortably with their oil at 200°F. and can survive, for a while, conditions that raise oil temperature to as much as 250°F. The oil itself will accept much higher temperatures, but those tend to reflect scorching-hot bearings, pistons, etc., and may be taken as a signal to slow down and give your engine a chance to cool off a bit. We know of a few motorcycle engines that cannot be made to hold their oil temperatures below 325-350°F. unless either fitted with an oil cooler or used with great restraint by their rider; they survive, but the lower operating temperatures have been established for aircraft and other kinds of engines and one must assume that reliability ultimately must suffer at the higher levels.

You obviously cannot measure the temperatures and pressure given here unless you install the instruments that do the measuring. These instruments may be obtained from various sources, VDO and Stewart-Warner being two that spring instantly to mind. The details of installation you'll have to work out to suit your particular motorcycle. The main point of concern in this is that their sensors be placed so that they actually pick up the desired information. Oil pressure should be taken at some spot in the engine's main gallery; many times there will be restricted orifices limiting oil delivery to the cylinderhead, and readings taken downstream from those orifices will be unrealistically and alarmingly low. The oil temperature sensor should be located in much the same place, though not for the same reasons. If you insert the sensor bulb into the oil sump it will be insulated by a layer of relatively cool oil clinging to its surface and thus read too low. The other extreme is represented by a temperature sensor screwed directly into a cylinderhead, where it would pick up heat from the surrounding metal and read too high. The sensor should be placed where it will be scrubbed by moving oil, and where it can accurately pick up the temperature of the oil itself and not that of some overheated metal casing.

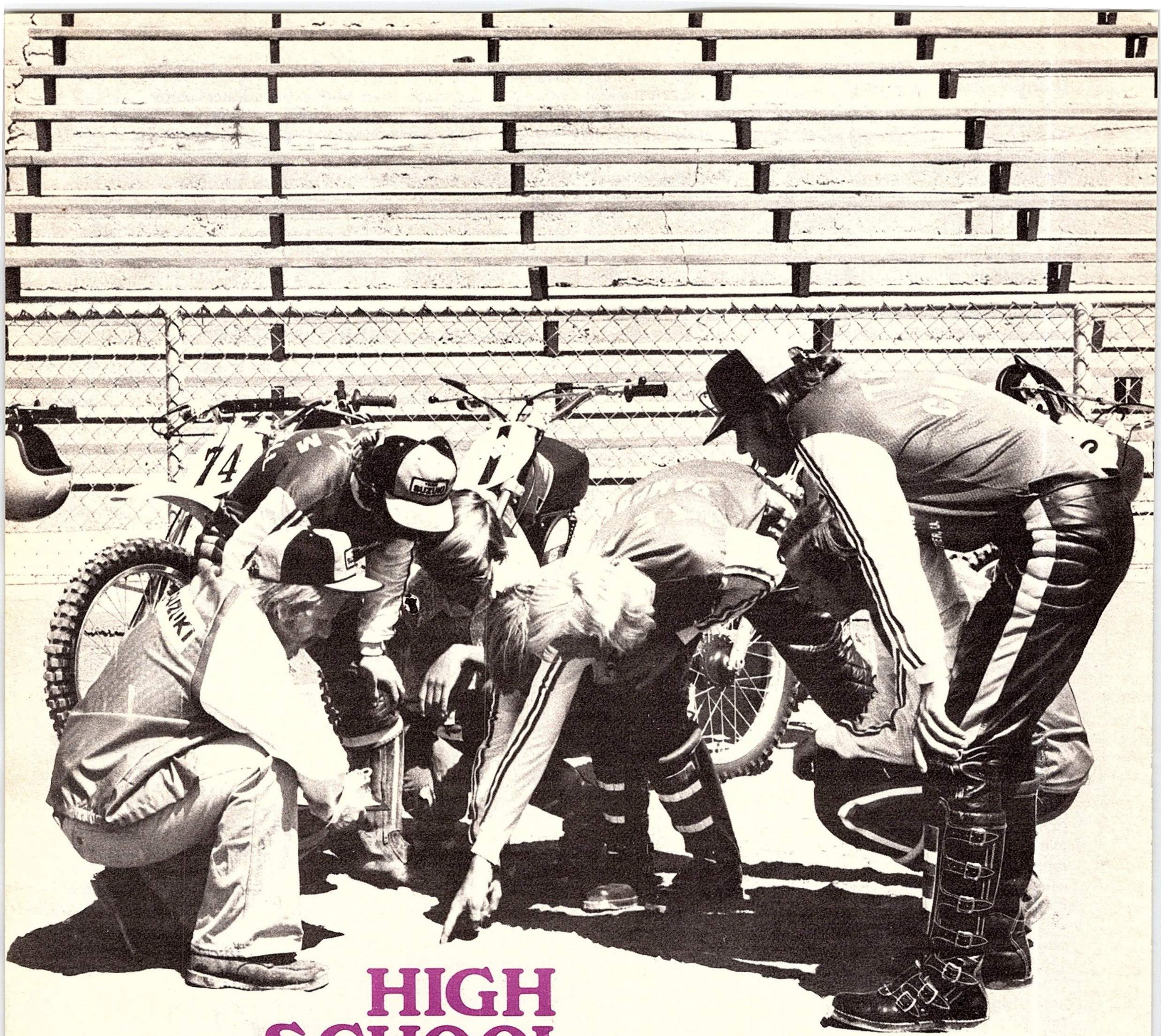
We recommend using pressure/temperature instruments with electrical sensors, if they are available. There's nothing wrong with the ones having a capillary-tube connection between the sensor and the gauge itself, except that it sometimes is difficult to find a tidy routing for the rather fragile tube. Also, the motorcycle's high level of vibration can cause the tube to fracture. The electric sensors need only a small wire for their connection with the gauge, the wire can be tied in knots without effecting the instrument's functions, and if the wire breaks you won't have a stream of oil squirting you right in the eye.

Vacuum gauges are thought to be exclusively the property of tuneup mechanics and weird old guys who also have a compass mounted on their Rambler's instrument panel. In fact, you can get some worthwhile information out of a gauge connected to register manifold vacuum, and it does relate to *total* tuning—including some engine modifications. Assuming that you haven't changed gearing, then manifold vacuum at a given speed, on a level road and in still air will reflect the success of any tuning changes made. That is to say, if you change the engine's spark advance or jetting and get a little more power then it will take just a little less throttle to hold a given speed and the gauge will show a slightly higher manifold vacuum. The same response will be observed with changes in compression ratio, valves, porting, and anything else that does not too greatly elevate the speed at which an engine makes its power. Conversely, if you find you're getting lower manifold vacuum readings after, say, a change in ignition timing then you may be reasonably sure your hot setup has proven to be only luke-warm.

Two-stroke engines can hardly be said to have any oil pressure or temperature, and all those with water cooling have that instrumented by the makers. But there is one rather specialized gauge that profitably may be applied to two-strokers: the spark plug thermocouple. As it happens, two-stroke engines are both very succeptible to detonation, and very apt to suffer catastrophic piston failure as a consequence of that combustion process irregularity. We have a fair amount of experience with dynamometer testing these engines, and use spark plug gasket temperature as a kind of thermal redline. There are thermocouples you can substitute for the ordinary spark plug gasket, and when the gauge to which the thermocouple is attached says the plug temperature has reached about 450°F. it is time to ease back on the throttle. Our experience is that the temperature will rise relatively slowly until it nears four-fifty; then it will begin climbing very rapidly—probably due to the onset of detonation—and if full throttle is maintained the dynamometer needle will start to fall back toward zero. When that happens you can plan on replacing a piston. Thermocouples and the related hardware are very expensive, so we certainly are not recommending that every two-stroke engined motorcycle should have plug-temperature sensors; the equipment is small and could be mounted on a bike for use in experimental work, where it probably is cheaper than repeated engine rebuilds.

One instrument *every* motorcyclist should have and use is a tire pressure gauge. Sure, there's one connected to the air hose at most service stations, but those are often wildly inaccurate, and quite small changes in tire inflation pressure have a large effect on handling and tire tread life. Manufacturers do a lot of testing to establish correct tire inflation pressures for motorcycles; all their work goes for naught when the customer relies on those service station gauges.

There are other forms of instrumentation, some of which does not involve wiring and cables and dials. At this moment our shop contains one motorcycle with experimental brake discs (aluminum, with a sprayed surface coating) and the operating temperatures of those discs are being monitored with a couple of tiny, heat-sensitive decals. Dots on the decals turn color at 350, 400, 450 and 500-degrees, providing a permanent record of how hot the discs have been. There are other decals for other temperature ranges, and heat-sensitive paints and crayons to accomplish the same thing. Such devices have been coming into use here and there, mostly in racing, and we expect that this kind of technology eventually will trickle down to the shade-tree, private-owner level. It's all part of a growing recognition that motorcycling should be much less art and more science, and that instrumentation really is the distinguishing feature between the two fields. ◉



HIGH SCHOOL MOTOCROSS

How will they keep them down in the gym after they've read all this?

By John Ulrich

● The Los Angeles Coliseum, June 22, 1974. Over 40,000 motocross fans waited for the start of the half-time show. Billed as the California High School Motocross Championships, promoters had whooped that little Billy from Uptown High could show his stuff on the same (almost—minus the uphill/downhill) track as Roger DeCoster and Jaroslav Falta. Keep your eyes on the track folks, they said, for the "half-time" extravaganza at the Superbowl of Motocross III.

If fans expected cheerleaders, school letters, bands, and high school herodom, they must have been disillusioned by the spectacle. At the finish, it was not little Billy from Uptown High in the spotlight, but rather Marty Smith, a 17-year-old Honda factory rider who just happens to be a high school student. Marty didn't stuff it to a bunch of innocent amateurs. His opponents, selected through a series of non-school sanctioned races run by professional promoters, were among the best 125cc Expert class riders who race for money in Southern California.

The expanded and exploited version of High School Motocross at the Coliseum was far removed from its origins in the state of Washington. When 16-year-old Jim Selden organized the first high school motocross in 1971, it was what the name suggests: school sanctioned, student supported, amateur competition between different schools. The elimination races and the Superbowl half-time show were sanctioned by a profit-making organization; seasoned racers took part in the professional competition.

The divergence from the original concept grew out of convenience and adaptation. Balky school boards and uncertain administrations pushed frustrated students into the waiting arms of professional race promoters and publicity-hungry firms. High school motocross grew anyway. Now everybody wants to get into the act.

There are several approaches to staging a high school race. The first type is the true high school race. Like an event of any other type of sport associated with high school, the school system sanctions the race. But difficulties beset this kind of racing. This is the toughest kind of race to promote because it gets entrapped in red-tape bureaucracies and by the sheer number of paper-movers and decision-makers involved.

The second type is the non-sanctioned high school race. In this case a group of racers who happen to attend School A race against a team of motocrossers who happen to attend School B. The easiest and currently the most popular type of high school race, these events bypass school district red-tape. Professional promoters at an established racetrack stage the races in return for cold cash.

The Sanctioned High School Race

Student motocross meets, blessed and supported by school officials, take several forms. A race may be restricted to students from one school on a track fabricated on school grounds, or it may be an interscholastic contest open to two or more schools held at an established race facility.

The event may be run by knowledgeable students, or handled by an outside organization. In some cases both on- and off-campus races are run with school sanctions, and a professional promoter organizes the event—for a price. What form a high school race takes after official school sanction is usually dictated by several things—liability, safety considerations, and availability of facilities.

Liability and Safety

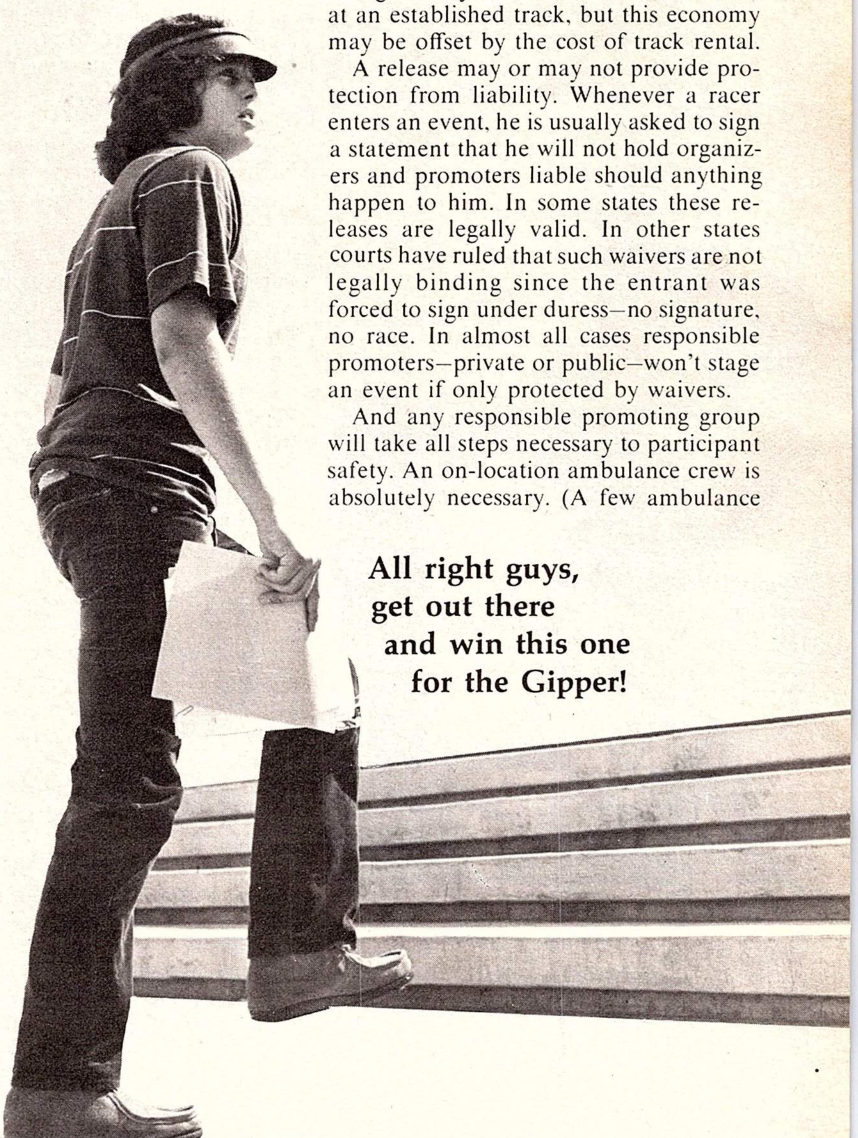
Liability is the largest single obstacle to high school sanctioned races. No school district wants to get sued to dust and ashes because 38 Novices killed themselves in the first turn of a home-built course which had a bulldozer as a corner marker. Since school officials generally think motorcycles are fairly lethal, danger is the first concern of school authorities.

Insurance can cope with liability problems. A school district's general policy may cover any liability arising out of a school sanctioned race, but this is not always true. Indeed such liability policies may only concern certain enumerated activities. If schools want to stage motorcycle races, this may require renegotiation of the school's liability-insurance package. In some cases, alternative insurance sources must be found.

Some insurance companies, such as E. Broox Randall, Inc., specialize in insuring high school events on a one-time basis. One school in California, for example, bought a Continental Motosports Club sanction/insurance package. CMC was the local race organizer. Each rider joined CMC for a $7 fee, the school pitched in about $150, and the race was run on campus. A one-time insurance package will generally cost less if the race is held at an established track, but this economy may be offset by the cost of track rental.

A release may or may not provide protection from liability. Whenever a racer enters an event, he is usually asked to sign a statement that he will not hold organizers and promoters liable should anything happen to him. In some states these releases are legally valid. In other states courts have ruled that such waivers are not legally binding since the entrant was forced to sign under duress—no signature, no race. In almost all cases responsible promoters—private or public—won't stage an event if only protected by waivers.

And any responsible promoting group will take all steps necessary to participant safety. An on-location ambulance crew is absolutely necessary. (A few ambulance



All right guys, get out there and win this one for the Gipper!

PHOTOGRAPHY: JOHN ULRICH

firms have been known to give school races a price break the first time.) The chances of an injury in motocross is almost as great as those in tackle football, and provisions for speedy aid must be made.

Alert, conscientious flag men are equally important. It is flagmen who warn racers of fallen riders or other obstructions ahead on the track, and they can prevent a minor fall from turning into a bone crunching pile-up.

Facilities

Many high school races have been held on flat grass courses outlined with old tires on football practice fields. Others have had more elaborate "home built" tracks, with log-supported drop-away jumps, waterholes, berms, and artificial whoop-de-doos. Some were built inside stadiums with tarps protecting the cinder tracks, and the spectators safely seated in the stands.

In recent months, more high school races have been held at professional raceways. This poses additional insurance problems, since schools are generally liable for the welfare of students while travelling to and from all school-organized events.

It's still a low intensity sport and that's how it should remain.

The facilities can easily shape race scheduling. If there are no lights on the track, then the race must be held during sunlight hours. Track stands, fences, public address systems, restrooms, or the lack of them, will determine spectator capacity, safety, interest and comfort.

Fund Raising

Insurance and course rental—or track construction—cost money. Traditional fund-raising activities may be applied to promoting two or three hundred dollars for a school race. But methods outside of car washes or bake sales also may be employed. Assuming the race is well publicized and attended, a moderate spectator gate admission will generate revenue. A $5-per-rider entry fee and donations from local businesses will help too. In some cases, one large firm has picked up the tab for PR reasons. The hard part is getting money without relinquishing control. A big-bucks, blood-and-guts race can be seen anytime. Ideally, high school racing should be different, run by and for students, and not to oil some business's publicity machine.

Prizes and Awards

Trophies are nice. Nevertheless a chance to win some boots or a helmet can mean more to a young rider racing on a paper-boy budget. In high school motocross, schools with good luck and hard workers have come up with fantastic prizes donated by local merchants or bought with extra funds. Woodshop classes have manufactured beautiful turned-walnut trophies as an alternative to massed-produced trophies. Some acquire win-place-and-show hardware from a combination of sources. The trick is to get some far-out prizes and still avoid rampant commercialization of the event.

Organization

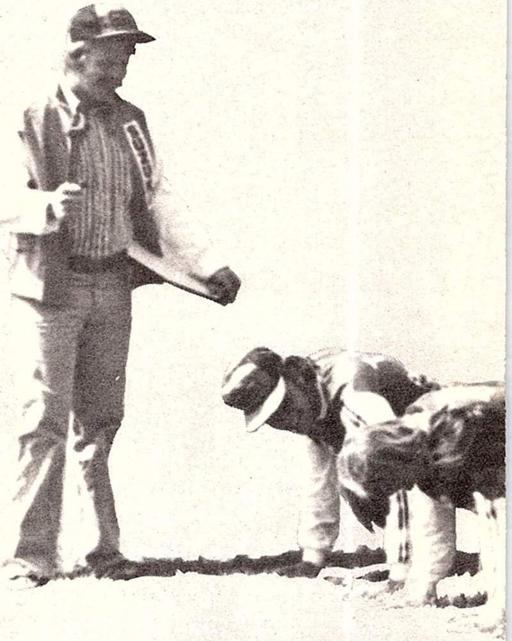
The people who do the work, handle the scoring, crowd control, and enforcement of the rules are the key element in organization. Experienced people who know motocross should assign rider numbers and score the races, quickly posting moto results and rider ID. Others must decide where spectators may and may not go, in order to prevent injuries, or thefts from the pit area. Whether they're rent-a-cops or lettermen, someone must control pit racing as well.

Presenting the Case

A would-be school promoter who wishes to persuade an administration or school board to sanction his race as a school activity should be able to answer their questions, deal with their fears, and possess a persuasive sincerity. Faculty and fellow students will prove invaluable allies. A detailed plan covering everything about the proposed race, a number of letters written to the school and community papers, and a smiling delegation of articulate campus motocrossers will likewise help to win the case.

Calm, reasoned presentations by a few students works well with school administrations, but when the time comes to put it to the school board, it's time for all out enthusiastic mass support. After the dynamite plan presentation, supporting testimony must be recruited from friendly interests—parents, community leaders, local businessmen, student leaders. And plenty of people in the audience busy smiling away are also important.

High school racing often involves many



Push-ups are old stuff in school athletics, but girls racing may be more than some old-school coaches can take.

students who are tuned out of traditional school sports—this point counts heavily in an era when schools are supposed to be "relevant" to students. Students who are interested in bikes need, desire and deserve appropriate school programs. Simply because motocross racing is new makes the sport no less important than the traditional sports activities of football, basketball and track.

Alternatives

If all of these approaches fail to convince school officials to sanction your motocross, don't give up entirely. Ascertain the weak points of the opposition and work on countering opposing arguments. Improve portions of your case that didn't quite work, and polish those that did. Look for more support; then try again next year (or even next month).

Non-sanctioned High School Races

A non-sanctioned race can be very simple. They're held at established tracks, which usually have their own insurance, and the paid promoter usually runs the event. All the students usually must supply are racers, spectators and money.

In a few cases, students may have to supply scorers, flagmen, ambulance, insurance, track rental and preparation fees—everything short of the track itself.

In other instances a promoting club may just add a high school race to its regular race program on its regular race day at some track. All it takes is finding a promoter willing to do it.

Over a four month period early this year, 16-year-old Mike Thatcher of Diamond Bar, California planned a three school race he hoped his school would sponsor at a nearby raceway. Able to answer every question asked by apprehensive administrators, Thatcher was sure of success.

Elaborate schemes to finance the motocross were abandoned when Mike convinced Yamaha International to bankroll the contest as a publicity venture.

The school district superintendent backed out two weeks before the set date, calling for an investigation of liability by district lawyers.

Yamaha, still interested in high school motocross, sponsored a non-sanctioned series involving over 40 schools at the track Mike had planned to use for his race. High point riders from each event became eligible for the Superbowl intermission moto.

Pleased with the series, Yamaha started negotiating with the California Interscholastic Federation (which controls school sports in that state) to obtain a 1975–1976 statewide sanction for the program. Company officials feel that a nationwide series is a possibility within two years.

Thatcher and his friends raced in the non-sanctioned Yamaha series.

Gas It

High school motocross, both sanctioned and non-sanctioned by school systems, is still relatively free of the common "go out and get blood" hysteria of high school football. Its greatest threats are the vicarious athlete-parent syndrome and the big-bucks exploitation. In spite of these potential spoilers, high school motocross still beats chasing around an inflated pig bladder.

Sources

E. Broox Randall, Inc.
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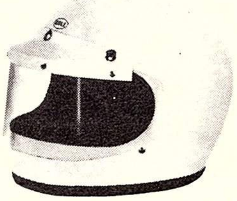

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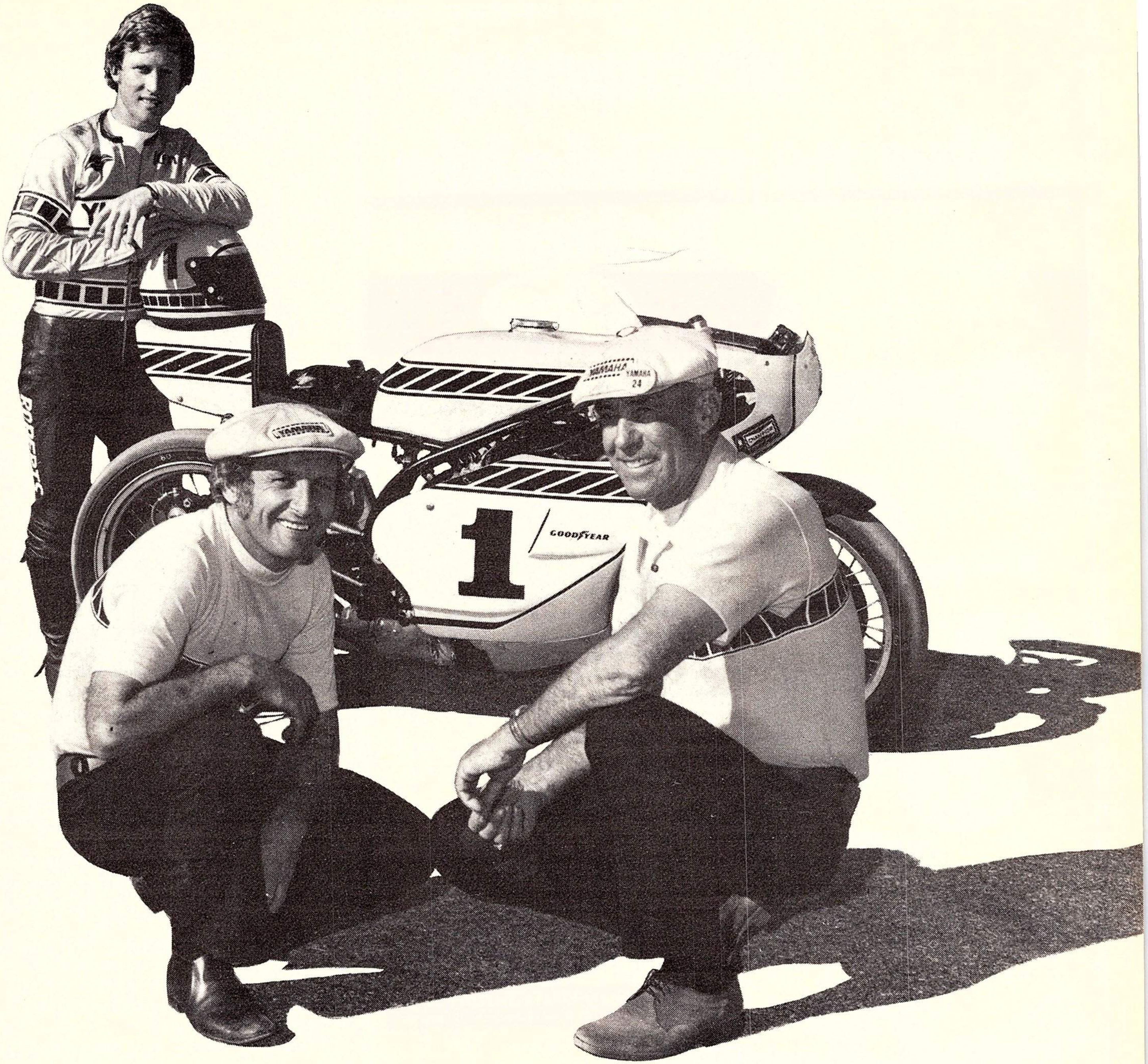
SUZUKI APACHE *Continued from page 59*

was asphalt scratching on tight secondary roads. It would hold a precise line, wouldn't wiggle and was virtually unpassable on really demanding, twisty roads. The new L-model, however, tends to oversteer in turns, it wants to dive and hunt on certain road cambers. The chassis or suspension (or both) let the bike squirm more often than the old model. The block pattern compromise tires certainly are not ideal for asphalt; nevertheless the new Apache doesn't handle as well on the street as other enduro bikes shod with similar tires.

The new Apache's handling in the dirt is markedly worse than the street. Known dirt roads with good traction and minimal hazards can be traversed at a moderate pace with some sense of security. Once the terrain becomes slippery or marbly the Apache's top-heaviness (more than the tall XL350 Honda with its high center of gravity) gives the rider the feeling that the tires will squirt out from under him at any time.

In off-road handling and comfort, Suzuki has gone backwards in several areas of design with TS400L. The frame cradles the large engine far higher than is necessary. With the rise of the engine comes increased foot peg and saddle heights which lessen stability at cross-country speeds. The newest motocross-type front forks are longer than previous models and the 21-inch front wheel has a 1.25-inch larger radius than the old Apache. These two changes raise the front of the motorcycle nearly two inches. Even with a downswept exhaust the TS400L has a whopping 9.5 inches of ground clearance at the bottom of the muffler. All of this unnecessary height gives the bike a scary, teetering feeling when trying to ride quickly over rough terrain.

Use of the motocross forks on the new Apache would seem to be a good decision, but that's not the case. *Cycle*'s fork com-



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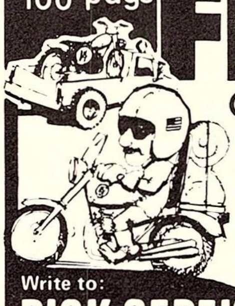

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parison (July, 1974) revealed that Japanese forks generally lack good suspension damping. The TS fork suffers from over-damping; so great is the hydraulic rebound restriction, the fork won't return as quickly as it is compressed. In a series of bumps or dips the fork continues to dive, or fails to return to full extension in each successive depression. Finally, you can end up on your nose before you know it.

The spring tension front and rear seems to be well in line of compromise standards. Most riders, light or heavy, have all the tension they need without getting a bone-jarring ride. The rear shocks, inverse of the forks, have very gentle damping that fades away when hot.

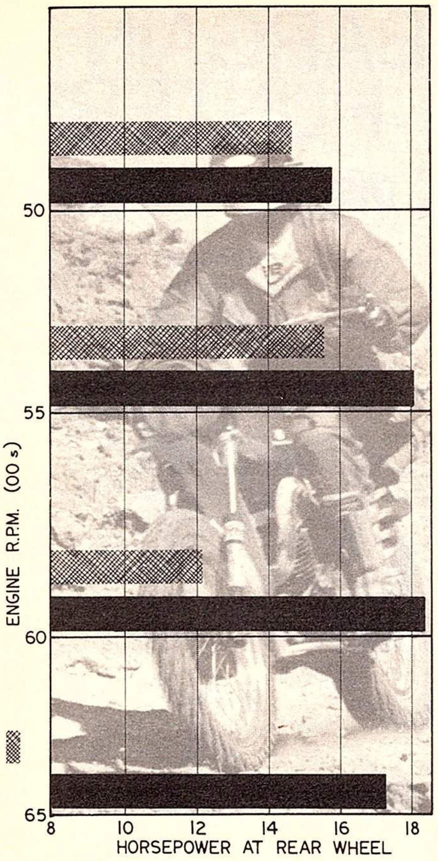
Further deterioration of steering control comes from mounting a great deal of street equipment on the fork assembly. Rather than using a smaller diameter headlight and lighter plastic housing, Suzuki has attached a very heavy chrome steel unit on the Apache. It is too heavy, and it lacks the pliability of plastic. The bright chrome produces constant reflective glare into the rider's eyes. The instruments are mounted on a steel plate and shake vigorously as the engine trembles.

With the bug-eyed headlamp projecting eight inches in front of the steering stem center, and the bulk of the turn signals jutting out to the sides, there is considerable pendulum effect on the steering. It's like hanging a five pound weight out on the end of the front fender. This effect makes straight-line stability on dirt down hills a breath-holding experience—even for veteran riders. On slopes and level ground, soft terrain seems to invite the front wheel to drive for the side and slam the fork assembly to its lock.

The saddle and foot peg locations are in normal relationship to most torsos. The saddle is three-quarters length and has a hand strap for passenger security. Buddy pegs are also included. At 21 inches long it's shorter than the little 185 Suzuki trail bikes while being a full one-foot wide at the rear. It's too short for two up and too wide for passenger comfort. Solo riding makes the hand strap roll over and wind up like a large rope to wear harshly on your bottom side. In the dirt the forward slope of the vinyl-covered seat continually drives the rider up on the gas tank. You are constantly pushing yourself back with both arms and legs—very fatiguing.

Getting astride the machine requires a different approach even for long legged riders. You must stand back far enough to clear the right rear turn signal as you swing your leg over the saddle. Half the time we forgot (habit) and cracked our shin. But then we evened it up by catching our right Achilles tendon on the high tail light each time we dismounted. If you trail ride often enough the problem with getting on the Apache will solve itself. The first time you slide out or fall on either side the turn signals will snap off.

Operating economy is certainly sub-par.



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The best gas mileage we got was on the road (below 50 mph) was 32 mpg. We averaged in the mid-twenties. Full up with gas this gives the Apache a limited 60-plus mile range; that's far less than adequate. Finer tuning and a bigger gas tank would be absolutely necessary before making any out-of-town jaunts. Everything from handling to gas mileage will discourage a rider from using the L-model off-road. Other than the torque characteristics of the engine, there's nothing to recommend the Apache as a dirt bike.

An electrical failure caused our first test bike to be exchanged for another. The first TS400L smoked profusely (using Suzuki's own CCI oil) while the second bike didn't. The oil pump on the Apache is not adjustable for flow rate (as are other types) so we can't explain the differences.

The all-new air-intake design attempts to reduce induction drone. The air box is located under the seat and the small foam element is readily removed for servicing. The square foam element sits on the intake orifice like a hat. When removed the filter will dump loose dirt into the carburetor mouth.

On the street the TS400L is noisy, smokey and not particularly pleasing to ride. Even with all its torque we had to rev the engine when leaving a stop light to assure that it didn't suddenly cough and stop. The vibration is tolerable but not appealing.

Both engines refused to run smoothly under steady throttle at any speed. There seemed to be a mis-match of carburetion, port timing and exhaust. On the asphalt the engines bucked and belched at uneven intervals. As operating temperatures rose and fell the engine would detonate with irregular loud pings and then let the piston rattle furiously.

Suzuki calls the 400L an *enduro* bike but it falls short of those requirements except for the engine's tremendous torque band. It's less at home in the dirt than the XL350 Honda, 360 Yamaha Enduro, or even the Kawasaki 350 F-9 Bighorn. Where the old Apache could really give any bike a hard time on the tight secondary roads, the new TS400L is a follower, not a leader.

Suzuki changed the Apache because marketing research and buyers' surveys told Suzuki that enduro bikes spend most of their life on the street, not the trail. Consequently they responded by attempting to make the Apache enduro more streetable while retaining appealing off-road handling, comfort and performance. Their effort missed.

Had Suzuki made the Apache more dirtable by using just a dash of their world championship motocross experience they would have had a tremendous big-bore enduro bike. But they went in the other direction and made the TS400L a mediocre street machine and as well as an unacceptable dirt bike. In the process we lost an old friend. ◉

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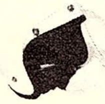

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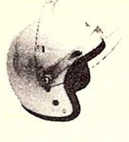

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CAN-AM *Continued from page 34*

75-pound springs and located them 5 inches in front of the rear axle. This combination provides the finest rear wheel control of any enduro bike we have ever ridden. Little bumps melt in the wake of increased travel, so you can remain seated through terrain that would normally shorten your backbone. The shocks don't go away after a few hours, and they bottom only rarely with the spring preload adjuster in its middle position. Perhaps the most miraculous back-end characteristic is that the 250 Can-Am stays straight while bouncing high off of consecutive whoop-dee-doos.

Up front, Bombardier has made two important changes in Betor forks which make them superior. Can-Am Betors have a two-way valve in the top stanchion nut which controls air pressure inside the forks. Excess compression pressure bleeds to atmosphere, thus preventing hydraulic air lock (which robs travel and results in a stiff ride). Air re-enters the stanchion as the slider pulls a vacuum on descent. The breather valve ensures free, consistent action which is uneffected by the amount or temperature of trapped air inside the forks. A second change involves a splash shield atop the piston rod which directs the geyser of oil generated by compression onto the stanchion wall, from whence it drains unhindered into the slider for instant reuse in the valving system. The oil in standard Betors shoots straight up when the forks compress and is slowed considerably in its return to the slider by the fork spring and a longer trip down the stanchion wall. In a series of quick bumps, enough oil can be slowed enroute back to the slider to cause a shortage—which will effect damping.

While redesigning the piston rod, Bombardier added a deep slot in the rod's top to greatly simplify slider removal, and relocated the drain plug to facilitate oil changing. The forks on our test bike were much too stiff with the 10-30 multigrade oil supplied, so we switched to ATF and got perfect action. In more than 800 miles of testing over every conceivable kind of terrain, the forks never topped, and only bottomed 10 or 12 times.

The tires which come stock on the T'NT are unacceptable, because both the engine and chassis far surpass a universal tire's capability in dirt. But since the Can-Am is street-legal in every state, and Federal law requires street bikes to be equipped with tires that the manufacturer is willing to certify as safe for street use, Bombardier lawyers will not allow Can-Ams to be sold with knobbies for reasons connected with product liability. We switched to a 3.50 x 21 Cheng Shin knobby up front and a Trelleborg 4.00 x 18 in back and got excellent results—at an added cost of $38.

Brakes, like the tires, are likewise not up to par. On our test bike no amount

(Continued on page 110)

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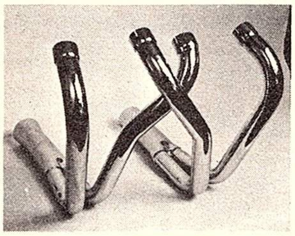

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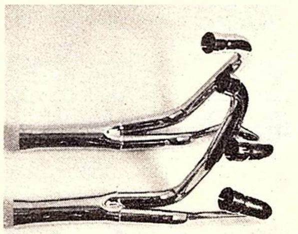

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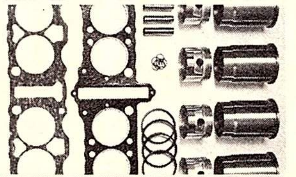

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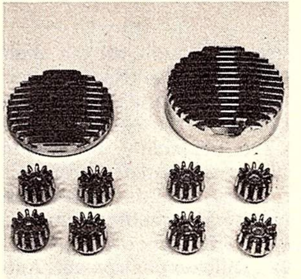

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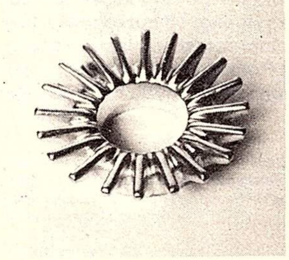

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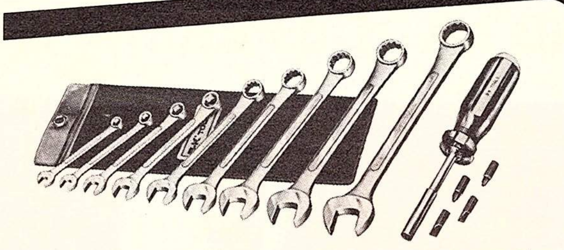

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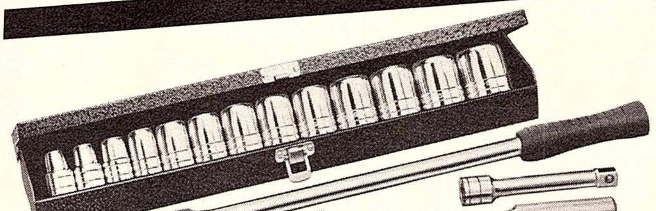

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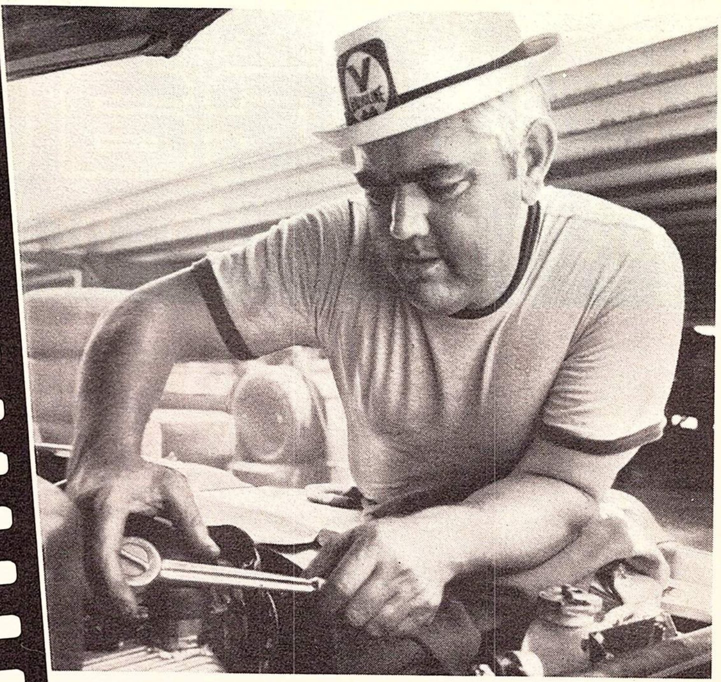

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CIRCLE NO. 36 ON READER SERVICE PAGE.

Downhill Straight

Project M-21

● It is, it must be said, possibly one of the best guarded stories of the entire war. No episode . . . be it the Siege of Stalingrad . . . the Battle of the Bulge . . . no, not even the Crisis at Crachzynikalonyesmovapaltz or the Norden Bombsight Saga can equal the security that surrounded Project M-21. Even today, not all of the truth is fit for the public eye. So, in keeping with the finest and most respected traditions of this fine family magazine, we will not tell the best parts until all of the little children are tucked safely away in their little beds or have been otherwise rendered insensible.

The whole point was the development of M-21. Now, to some modern analysts, Project M-21 may seem insignificant. It is easy to understand why, if one thinks of some modern analysts as a lot of know-nothings. However, if any credence can be granted their so-called rantings and ravings, a studied examination of the entire subject is in order. Fortunately, we do not have the time or space to go into such a study and you, dear reader, will have to take my word for it. And here it is: These modern analysts who say the planning for D-Day was more important than Project M-21 just do not know what they are talking about.

It was a situation that simply smacked of wanting to be explained in Shakespearian terms. For certain, D-Day was an historic and important undertaking. But could it have been pulled off without first having accomplished M-21? I hesitate to say yes, and rush to say no. I would only remind the reader of Richard III who lost his crown and other select parts, not to mention a Kingdom, for the want of a horse. Shakespear (or Shakspere, if you will) is very clear on all this. After all, few alive today (with the exception of those born after 1945) can forget the role played by the M-21.

In times of war there is always that urge to get out a secret weapon, or some other device that will help maintain the public sympathy for the whole effort and stimulate the belief that our guys are more clever than their guys.

No more patent example was there than the gun that could shoot around corners. This marvel of mid-forties technology was the answer to a P.R. man's prayer. On close examination, it seemed more the product of a Public Relation man's imagination. There it was in all its glory, with a barrel on it that looked like a limp salami. A rifled salami at that. Picture, if you can, a Browning medium water-cooled machine gun that has a ninety-degree bend in the middle of its water jacket. It was claimed that this device could shoot real bullets around real corners. What it did achieve was to shoot some real bull in at least three different languages.

The elbow-spouter appeared in Popular Mechanics, Mecaniques Populaire, and an underground copy of Meccanica Verghera. It made almost everyone, the enemy being a noteable exception, think our chaps were really on top of the latest in everything. Especially since the Germans had invented a similar weapon not three months before. The big difference between the German model and the Allied version was that the enemy gun was actually tried out. We knew ours wouldn't work to begin with.

Another example was the super-flexible trampoline missile launcher. Mind you that in those days missile was pronounced miss-aisle and had no resemblance to what we now consider to be a missile. Once adjusted for train and elevation objects, mostly medieval in character such as stones and the like, dropped properly into the center of the trampoline would travel considerable distances with more or less devastating effect. Unlike the gun that shot around corners, this device was operable, and, although it did not prove to be a valuable weapon in terms of actual battle effectiveness, it did provide the troops with entertaining physical exercise which is in itself a valuable contribution. As any commander of men can tell you, a healthy command is a fighting command, which is to say, a healthy command is a happy command, especially if there is fighting to be done, which, in time of war, is often the case.

Yet a third device was of German design. Called "Goliath," it was a small radio-controlled tank model made to carry a charge of explosives to somewhere you maybe couldn't get some half-baked hero to carry it. It did not get much use, perhaps proving that it didn't work so well as it was advertised in the press, or perhaps proving that there were more half-baked hero types around to carry the charge than it was expected. Current-day military analysts tend to believe the latter without ever having considered the former.

Without citing more examples of how the various forces tried to out-do one another in the area of highly publicized secret weaponry, suffice it to say that it was done wholesale.

Project M-21 was not one of these programs. It was inevitable, however, that some of the carnival atmosphere of war should creep into the process, and so what started out as a fully serious meaningful attempt to set the course of military motorcycle development for the decade to come (and thus incidentally influence post-war manufacture) did actually deteriorate at points into what is now often laughingly referred to as an "operation world-beater." The world-beater complex survived the war and empire although the M-21 project—to put the British dispatch rider aboard the best bike believable—barely survived its inception.

As it happened, and we are assured that this is the pukka version of the story, it was just after Whitehall gave the program its grudging blessings and the project leader had been chosen.

Chosen for the post was Sir Basil Basil, at the time Royal Signals, Retired, and before that OBE, OBA, BHP, and QED. Sir Basil had been in on the motorists first big war and at that time had been pinched on numerous occasions for moving violations. Sir Basil's citations were not alone among his other qualifications, but they were outstanding.

A few high points in his folder seemed to further qualify him for the job. One was the recommendation of Lord Fotheringson of Hollycoast, the famous munitions magnate. To have the blessings of Lord Fotheringson was to have it made for life or 100 years, whichever came first. It was word of such power as to insure the immediate success of any in its possession, though Sir Basil must have appeared a poor example of its worth, such was his run of luck. Like the cycling accident that severed his right pinky giving him a distinctly oafish appearance at tea.

And the incident that almost ended the M-21 affair at its onset, when the Austin Seven he was austerely motoring along in at 15 mph suddenly and inexplicably turned turtle, dumping Sir Basil rather unceremoniously on his overseas cap. Dumped but undaunted, Sir Basil, showing the pluck that he was so noted for, thumbed a ride on a passing Rudge Multi and was on his way again. A verbal exchange between his chauffeur-of-the-moment and a produce lorry driver nearly turned to fisticuffs and a slipping drive delayed his arrival more, but Sir Basil did in the end arrive at his destination.

That destination was for a time a very closely guarded secret. The location had been chosen carefully by MI-5 so as not to arouse suspicion. The place chosen was a cozy flat over an upholsterer's shop in the London suburb of Twickenham. It was to serve as the office, drafting room, and what would have been the think-tank for the group if such thinks had been thought of at that time. As it was, that function was served by the drawing room and, on less formal occasions, the lounge of the Rose and Crown down the street.

This very comfortable arrangement did not last long, for, as already mentioned, the cover was soon blown. Sir Basil in an outburst of group pride had caused a large gold-leaf-on-deep-blue sign to be painted and installed at the eaves, proclaiming to all who could read that this was indeed the headquarters of a "Project M-21." At the least, although the location had been temporarily revealed, its purpose had not. None the less, all of the MIs—5, 4, 3, 2, and 1—were all sorely vexed by Sir Basil's conduct of the matter and they threatened to take away his security clearance. It was in a state of disbelief that they dropped the matter when Sir Basil announced that should his present security clearance be dropped, he would simply go get another one.

So it was with cautious skepticism that the security agencies greeted Sir Basil's proposition which arrived by dispatch rider the next afternoon. Their initial uneasiness was soon allayed by the sheer brilliance of Sir Basil's note, which is quoted in toto from his own memoirs:

"CABLES SECRET EXDIAL MOTORCYCLE SHOP BEST PLACE HIDE MOTORCYCLE SHOP" was the first line and it had them going for a bit over at security. Why, they wondered, had they not thought of it first? The genius of it was apparent on sight.

"FOTHERINGSON AGREES," the message concluded. This added fillup was not wasted. It may not have been needed, but not wasted.

The last appendage insured the suggestion would be accepted, and it is a tribute to Sir Basil's contempt for red tape that he did not have his secret message encoded, thus ensuring its more speedy handling. Be it his wit, or just another device to hurry things up, Sir Basil always tacked a red "This End Up" label to most of his correspondence. He was always to be found rummaging about in card and gift shops for some little sticker he'd find appropriate to stick on his letters.

Selection of a site posed certain problems. The shop location had to be so chosen that it would not be in a busy commercial area. It would not do to have it be so well-located that it would have customers coming in and out all the time interrupting the development work. On the other hand it would appear unnatural if the shop were placed in such an out-of-the-way neighborhood that no customer would patronize it.

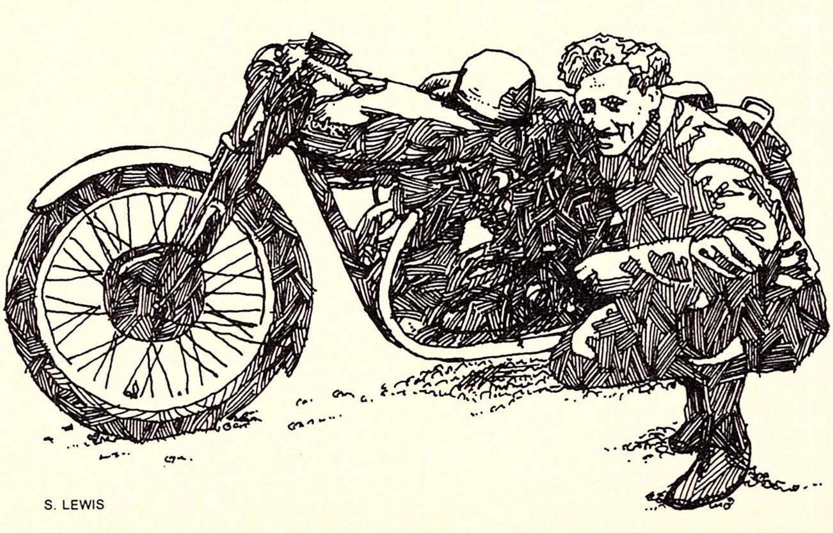
The dilemma was solved once again by the genius of Sir Basil himself. Rightly reasoning that an out-of-the-way shop would be more conducive to productivity, and that one without customers would raise suspicions, Sir Basil opted for a bad location and had orders issued to the effect that all local service personnel were to bring their bikes to the shop for service whenever possible. This, he was sure, would bring an adequate flow of imitation business to the store. From a rational point of view, Sir Basil had it down pat. In practice, however, the idea did not pan out entirely as expected. In an effort to be completely authentic in appearance, the Project M-21 workers at first actually tried doing repairs on the bikes brought to the shop under Sir Basil's orders. As might have been expected . . . but wasn't . . . was the fact that while the Project people might be very good planners, they were a bit weak on the dirty-work. This caused no end of problems when a number of "customers" threatened to sue for poor service. The practice of mechanicing was soon ended and a proper cover was maintained by keeping some old machines in partial disrepair around the benches. One workshop wag noted that they could have set up in a much more convenient area, and, by doing some actual repair work, they would shortly drive away all possible customers and not be disturbed in the least.

In the interest of security, some interesting lessons were learned. One day early in the project, a casual window-shopper was heard to remark that the shop looked too clean to be much of a motorcycle business. The workers, all military or former military men, went through the usual daily cleanup routines they had learned in Army life. This habit had to be dropped, and it was. No sooner had the orders come out than the men, with great dilligence, became as slovenly as civilians. In no time the place was a mess as fit such an establishment.

Other little details were likewise noted and remedied in turn. One was the hard-to-shake habit of saluting. Even Sir Basil thought this was out of place in what was supposed to be a bike shop, and so, even though it went against his disciplinarian grain, the men were ordered to stop saluting on the premises. Hat-tipping was substituted for saluting at first, but this too had to stop because it was rude for them all to go about with their hats on. Other articles of clothing were proscribed in time, such as the black suits, bowlers and umbrellas worn by the supposed "mechanics." They really looked out of place, but no more so than Sir Basil who occasionally forgot and came into the shop in full-dress uniform. At such times one of the quicker wits would pop right up and sell him something. He would then depart, go home and change, and return properly attired as the proprietor. Of course Sir Basil considered a hounds-tooth track jacket, mauve plus-fours and a deer-stalker cap to be the proper attire for motorcycle shop owners. How little we all knew then, that this would, in thirty years, indeed be the vogue.

The clouds of war had long since spilled their venomous rains on Europe and England and still the M-21 group had yet to come to terms with its assignment. Nay, it had yet to come to grips with it. For reasons of security (that bugaboo of progress) no mention of the intent of the program was to be made save by duly authorized personnel. This classification mostly included Sir Basil and his Chief Deputy, Nazio Fine, Lt. Col. RAS Ret., Reg. Ltd. Etc.

What havoc was almost wrought upon



M-21 by this seemingly innocent circumstance. Yet as it developed, neither Sir Basil nor his adjutant Lt. Col. Fine, both rather taciturn men, were about to mention the project. Thus it was almost two months before anyone in the organization would acknowledge that they were even there for the same purpose. Certainly, there was cooperation all around in all matters, but only so long as no one mentioned what it was all about. A conversation between Sir Basil and Lt. Col. Fine went, reports have it, something like this:

"Good Morning, Sir Shop Proprietor," Fine would say, "Sir." And click his heels.

"As you were," Sir Basil would greet what was supposed to be the firm's bookkeeper. "Morning report, Number Two."

Fortunately none of this was ever overheard by any but the group people who at such times would stand up and tip their imaginary hats to each other.

Fitting out the physical plant was not much of a problem. Lt. Col. Fine contracted for the delivery of tools, display cases, posters for the walls, signs for the windows and the like. These were all obtained from either Army sources or for nothing or cheaply from civilian suppliers. Some troubles arose when it came to laying in parts, and accessories, to finish off the camouflage. Between them, Sir Basil and Fine did not have sufficient commercial credit to "go into business." It devolved upon the Army to pay out cash for everything, an unusual situation at best.

Procurement of machines for the "showroom floor" was less of a problem than anything. By curious coincidence, one of Lord Fotheringson's many factories was in the business of manufacturing motorcycles. What simpler or more economical means of supply could there be?

The machines were rather crude single cylinder side-valve affairs but although lacking almost completely in either style or grace, they had hearts (and parts) of iron. As with most other bikes of the time, the suspension was rigid aft, and more or less inflexible forward. The lightly sprung solo saddle offered a small degree of comfort, and the available pillion seat, mounted directly to the solid steel rear fender, offered none at all to any passenger unfortunate enough to wind up sitting on it. Unsurprisingly this model from the Beamish Square Arsenal works was named the "Solidly."

It was, without question a solid piece of work, as solid and reliable as could be, the only limitations being its electrical system. This failing, while widely acknowledged by the knowledgeable (and the motoring press as well) was mostly ignored by a small but loyal buying public. Said small buying public, under questioning, would only ignore whatever electrical malfunctions were being pointed out and submerge the sacriligious one in a sea of hot buttered nostalgia, purebred patriotism, and pleas to the contrary. They chose to ignore the innate tendency of the magneto to pack it in at the least sign of humidity, an unblemished record of voltage regulator failure and the inconvenient characteristic that caused the battery to fume, melting its hold-down strap.

Said small buying public refused to admit that the wiring was poor and ill-directed, or that the rubber used for insulation was more likely to harden and crack within the year instead of two. This last complaint could be met with the observation that, with the war on, the quality of rubber would deteriorate even faster than the old rubber. This was a reasonable approach, considering that plastics were not yet in any way ready for widespread and practical use. Even if they had been it was doubtful that Beamish, a slow moving and conservative old firm, would have used them.

So these, then, were the models that sat on the showroom floor at the imitation motorcycle shop. Interestingly, they had not been chosen to drive away interfering and unwanted customers, but to please Lord Fotheringson, whose pleasure was always sought, almost as much as his favor was. Their general effect was in all ways superb, at the same time giving the shop a good appearance and keeping away the odd customer or two that might happen in. This feature of those models was not pointed out to Lord Fotheringson, whose accountants held out great hopes for his investment in Beamish.

All of this sorting out and problem-solving took place during the first two or three months that Project M-21 was in existence. That, at least, is the official version. Information currently available indicates that the time period was more in the nature of six months, since it is inconceivable that Sir Basil, a gentleman of leisure at the time, could have mobilized in less a portion than that. That is not to say that Sir Basil did not handle all matters within the scope of his command with the utmost dispatch. His dislike for red tape was well known. It does seem, however, that after his aforementioned scrap with the security people, and the apparent lack of communication with his adjutant, Fine, that Sir Basil became for a while overly security conscious, and that served to slow things down even more so.

Noteworthy for its cleverness, in spite of the delays it involved, was Sir Basil's order that all of his command should learn code, and communicate all M-21 matters in that code. Interesting, perhaps perplexing, was Basil's choice of pig latin.

"Isthay ingthay ontway itfay onay attermay atwhay eeway ooday," came a plaintive missive from the try-and-error lads. They were referring to an experiment involving 19" wheels and 21" tires.

"Ifay ouyay onday ucceedsay, ytray, ytray, cteray.," came the reply.

Whether pig latin was an effective code or not, all the men became quite fluent in it before it was removed as the basic secret communications mode. There is sufficient evidence to prove their proficiency, as a visit to the old premises can show remnants of their writings on the bathroom walls.

Other attempts at standardizing a code for the outfit fell on more disastrous times. One rather shabby device used was to use number/alphabet code of the simplest sort, but to have the sender make it up in the form of a parts order. While this may seem to have been innocuous enough, the code messages were often mistaken for actual parts orders. The enormity of trying to fill parts orders made up of imaginary part numbers must indeed be staggering. A genuine parts man would have gone berserk under the load. Occasionally, a message would coincide with some actual part numbers and be mistaken for a genuine order, rather than a message. The obvious confusion this system generated soon caused the institution of yet another system which served the group from that time forward.

It was easily determined that if a number of people were to stand around and talk about a given subject long enough, the subject would become totally confused. It was this system that was finally adopted, and it should be mentioned that the very same technique is in use to this very day in every nation around the globe. It has been found to be the best security code ever devised, and at least partial credit is due to Sir Basil and the men of M-21.

Once clear of the problems of setting up and all the usual early difficulties involved in moving so weighty an organization as the Army things began to move rather smoothly. Sir Basil caught the knack of communicating his desires to his subordinates . . . remembered not to come to work in uniform. His subordinates caught the knack of losing Army routine . . . how to be inept and sloppy like civilians. It all became rather like a well-oiled family. The presence of the Black Horse around the corner didn't help any.

To the surprise of no one in particular, the assembled experts there at what came to be known (privately) as number 21 Nogginside Alley came up with some really startling designs, and, to most everyone's surprise some of the early ideas were adopted for use by the service.

In the early stages of development the single ideas flowered and were set down, later to be assembled into the bouquet that would be M-21. The footprint tire, for example. Here was the collective genius of the group displayed to best advantage. What a novel idea! Think of the surefooted Ghurka mountain troops. Imagine a tire tread made in the image of their feet! The sheer glow of the notion blinds the unimaginative!

From that one idea sprung others. As Sir Basil proposed in a meeting one late afternoon in the private lounge of the Black Horse: what if the surefootedness of the Ghurka trooper was not what was needed? What if the silence of a Bogside burglar was the thing? Could they not then go on and design a tire for that purpose. They could. And they did. But one development must lead to another, and, as the various foot-tread characteristics were applied to sundry tire types it was found that they left foot-prints which might not be desirable in full "heat of battle" conditions. Well and good to mislead the enemy into thinking there were Gurkas or foot-pads in the area, but what if you did not want them to think so?

The answer was the "grass" tire. This was a shoe so patterned as to have long strands of rubber hanging off the circumference of the tire. Their intended purpose was to sweep clear any prints the tire might leave. The effect was a bit startling at first, but one could get used to it in while. It was the whipping sound that came up from the road or trail (more likely) that was so strange. More uncomfortable was the actual whipping effect on the legs when the tires were still new and the strands still long. They did, no matter what the discomforts, obliterate the prints, but left an odd track of their own, rather like a motorcycle shod with sagebrush.

The coil-sprung solo seat was another product of the M-21 project. This fine idea failed to find full use although its potential was well noted at the time. It was an attempt to combine the comforts of the Harley buddy seat with the low cost of the standard issue bicycle-type item. The basis of the idea was to eliminate the costly plunger column used in the buddy seat, and simply use a large central coil spring. Riders who had the duty to test this device reported at the time that the vertical travel was ample to smooth many road shocks, but that there was an unsettling sideways sway when the machine was driven in anything but a straight line. The chief tester said in his report that some of his men had claimed a slight sea-sickness, but allowed on his own behalf it was just a thing riders would have to get used to.

An oversight in the assembly of some wheels one day led to the invention of a really smashing training device. Some spokes of mixed length had been laced into a pair of rims. When tried out on the bike it was found that one could have the sensation of riding in the rough without departing the highway. This meant that novice dispatch riders could be trained on the conventional parade ground handy to their barracks without a long trek into the wild. That is what was claimed for it in Sir Basil's report on the idea. Although the design did not gain the immediate popularity one might think it would, it crept into some later models, though inadvertently perhaps.

The group could hardly, in any honesty, claim the adjustable steering head as one of their children, but they did come up with one. An effort at a lower-cost mass-produced structure found the designers resorting to bolted lug frames. Cheapness was but one claim made for this method of manufacture. The frame could also be easily disassembled, making it ideal for highly mobile operations. The one drawback to the system, discovered by one of the stalwart testing crew, was the fact that the frame would disassemble without warning.

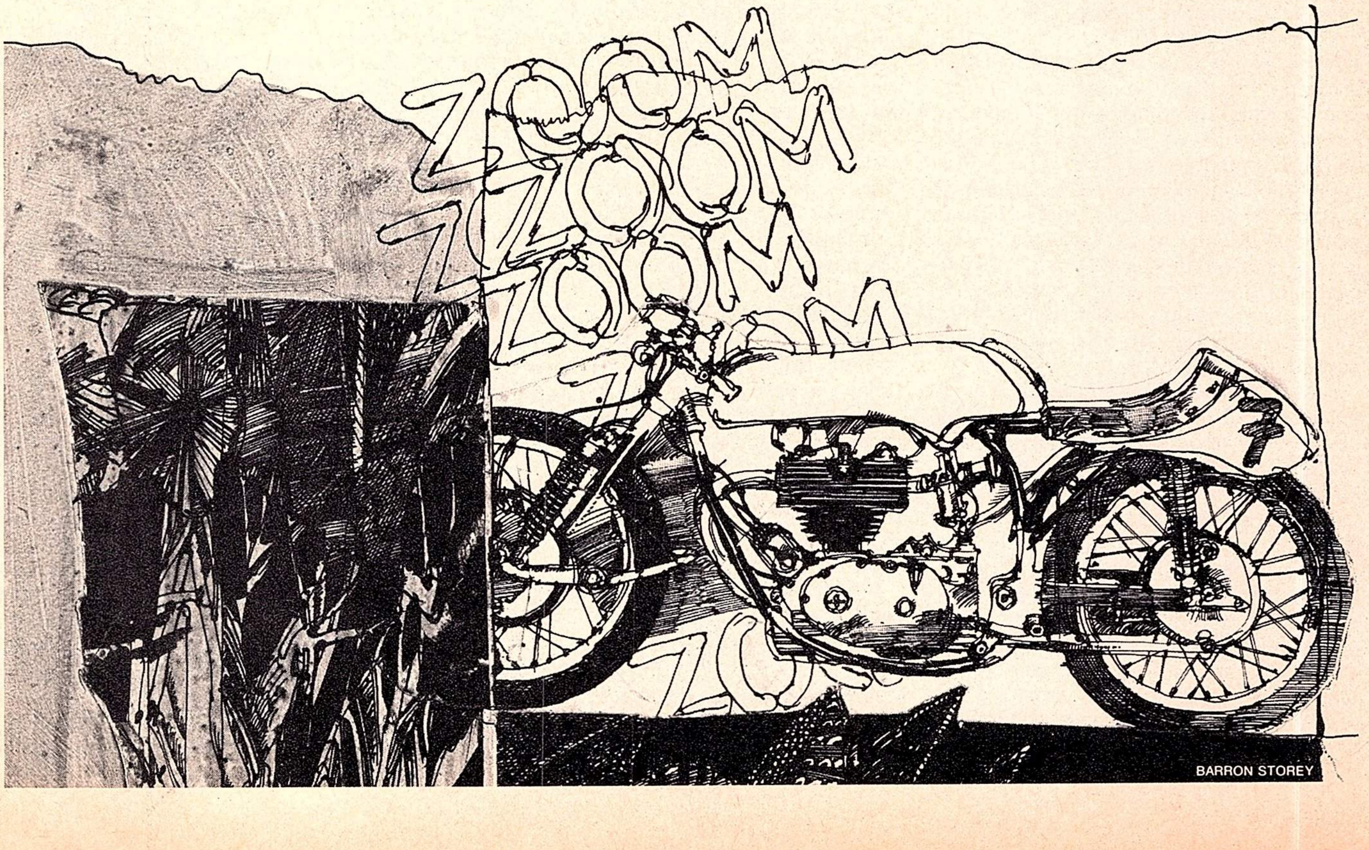
This episode brought a gloom over the whole project. It was hard to pinpoint, at the time, but it was this one little slip-up that had the greatest (worst), effect on the group. Morale seemed to ebb seriously after that, and not even the pep talks by Sir Basil himself could rally the troops' flagging spirits. For a while it seemed that Project M-21 . . . the plan to put the British dispatch rider aboard the best bike believable . . . would fade with a sigh.

But that was not to be. Britain would not have her "world beater" bush bike, but a machine she would have if it meant that Sir Basil had to hew it out of solid billet steel! That proved unnecessary, for Sir Basil proved to be no dummy.

With his reputation and his career riding with M-21, Sir Basil knew he had to give it his all. He had to go all out. Spare no cost. Avoid no risk. He considered it all that day. That night he was ready. That night, he, and a hand-picked sub-group entered the darkened shop. In a few quiet hours the job was done, and done well. The next morning Sir Basil could deliver the results of his group's efforts, the culmination of all the expenditures . . . all the design work . . . all the testing. The job was done. It was done in a way that would please most everyone.

At home in his Morris chair, Sir Basil reflected on the evening's work, and thought how well it would please Lord Fotheringson. He mused about how nice the olive drab paint job had looked on the Beamish "Solidly" after all the civvy stuff had been taken off . . . how sharp, the stenciled new name "BSA M-21" looked on the battery box. He dreamt of yet more citations as he drifted off to sleep. A job well done . . . . a job well . . . a job . . .

—Mike Shuter



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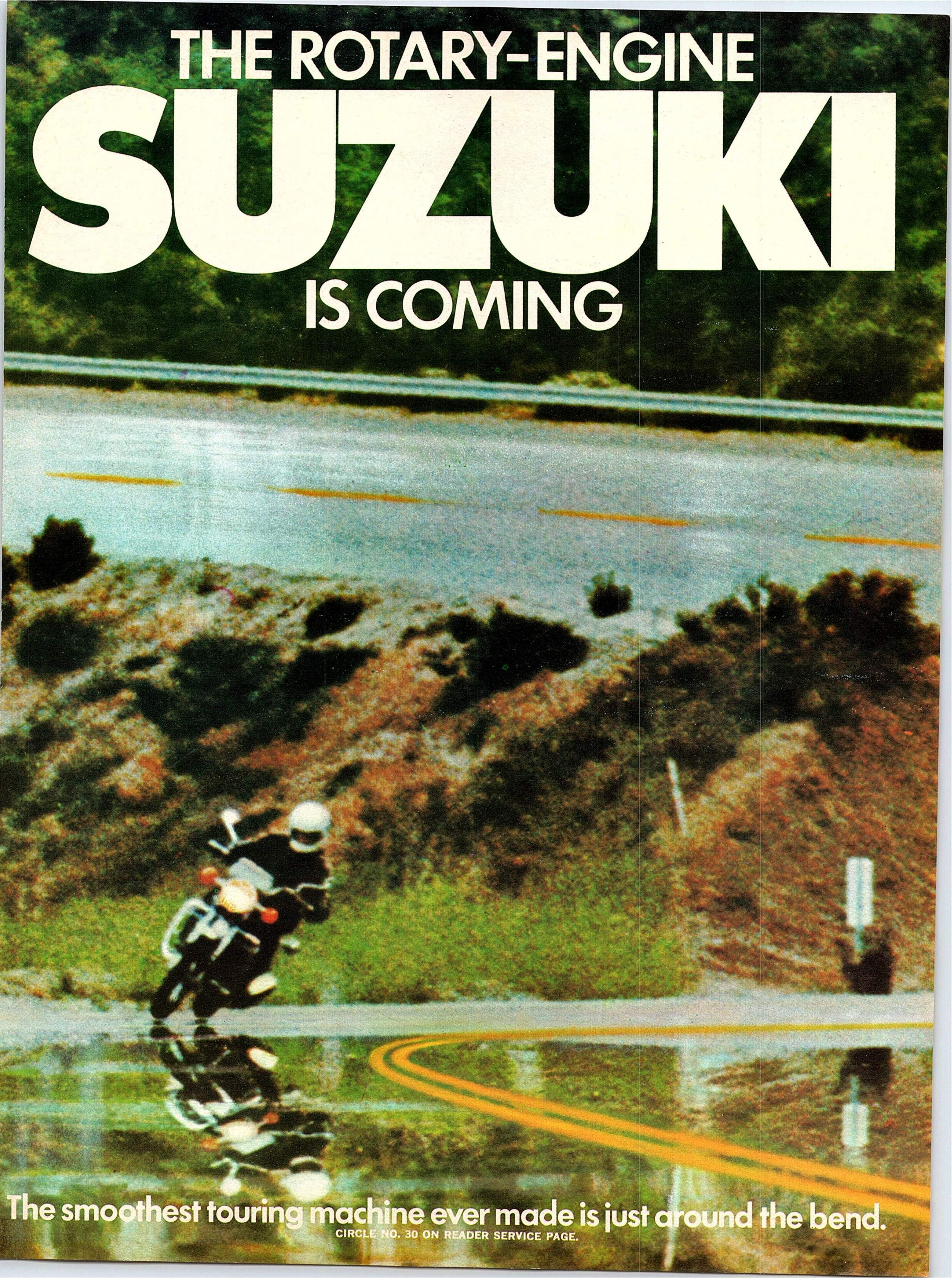
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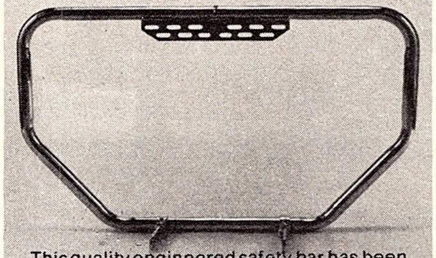

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CAN-AM *Continued from page 103*

of force would lock the front brake, and only great pressure would lock the rear. This soft braking provides adequate control in most dirt situations, but there's a large bush at the end of a straightaway in Baja that would argue the point. Gary Robison says nobody else has been critical of braking, so perhaps the cables or shoes on *Cycle's* test bike were defective or somehow maladjusted. Water penetrates both hubs easily, but burns off quickly. Clatter from the rear brake on rough downhills is surprisingly minor despite a non-fully-floating design. The wheels surrounding these brakes consist of steel rims laced to conical alloy hubs with 40 spokes in a cross-three pattern front and rear. Spokes are retained in the hub flange by rubber buttons, so they can't fall out if the rim gets dinged. Nor can they work free and puncture a tire should they loosen. Security bolts clamp the tire to the rim front and rear.

Other running gear items include unbreakable plastic fenders, a 2.5-gallon plastic tank (with a leaking cap), non-slip leatherette upholstery on a supple seat, Bombardier's own levers and grips, a kill button, an accurate speedometer with resettable odometer and a built-in spark arrester. Finish and execution match the best of Can-Am's competitors. Certain ideas are incredibly novel, such as the gas-cap breathing system consisting of a slitted rubber diaphragm, and the rear turnsignal mounts, which simply suspend the flashers on rubber so they bend away in a fall without breaking.

But in the end all the tricks and good looks are gravy compared to the bike's brilliance in tough riding situations. Power and handling are so good that speed, more often than conservatism, is the best approach to riding over tacky terrain. If there's a bump, use the throttle to lighten the front wheel and the suspension will handle it. If there's a long, cobby hill, hit the bottom all strung out in third gear and pound it out. If a sharp turn suddenly appears, don't grab the brakes and pray—gas the back end around and go. You'll be in trouble using the speed approach to off-road riding on almost every other enduro made. That's why the Can-Am is good. That's why it's worth its price tag of $1465 (which is still $245 *cheaper* than a Penton 250 Enduro). That's also why it's better suited to superior riders than average riders. If it isn't ridden fast, there won't be enough in its low-speed performance to offset the irritations of a low pipe, noisy exhaust, vibration, soft brakes, parts hassles, improper tires and mediocre bottom end.

But for the good rider, these or a dozen other problems won't dampen his excitement over the Can-Am's steering, suspension and power. If you're up to it, the 250 T'NT will make you the best trail rider you are ever going to be. ◉

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HONDA CR-72 *Continued from page 75*

engine, while the spring is a fixed value, you can get quickest action without float by using a higher acceleration in the cam-controlled phase than in the spring controlled phase. Usually, this is a ratio of two to one, but in this engine, it is three. The peak acceleration on the cam is 1575 Gs, at peak rpm of 12,000, an incredibly high figure.

A typical maximum acceleration from automotive practice would be 600 Gs, while Mercedes-Benz used 1200 Gs in the design of their desmodromic valve GP car engine of 1954. This, then, is why Honda never bothered with desmo valves; they could get the same results without all the added complexity and bulk.

Feeding the inlet valves through an inlet tract of 255mm total length are a pair of the familiar sand-cast Keihin racing carbs, on rubber mounts. These 29mm instruments are built to stay together, as everything that turns is secured by lockwire or special tabwashers.

The exhaust valves speak into a pair of 520mm long, 35mm ID head pipes that join long, straight-taper megaphones that enlarge to 90mm ID over 760mm. These gradual pipes were a Honda trademark, and are designed to exert a long, mild suction on the combustion chamber over a wide speed range, rather than a powerful and closely tuned one in a narrow range. The engine in fact has a powerband that begins at 8000 and runs to the peak of 12,000, with an 1800 rpm safety limit.

Sparks for the 10mm plug in each cylinder come from an energy transfer magneto. AC from a crank-mounted alternator is switched to the huge Kokusan racing coils by two sets of points whose cam is carried in its own bearings, geared to the crank on the left side of the engine.

The resulting pressure is converted to rotary motion by the exquisite full-skirted pistons and totally machined and polished conrod and crank assembly. Each piston carries two thin gas rings and one oil ring, and the crown is of simple pent-roof shape, matching that of the cylinder head.

Con-rod big-ends are on caged needle bearings, while the crank runs in two ball and two roller bearings.

A straight-cut primary gear pair carries power to the dry clutch, which in turn feeds the very close-ratio six-speed gearbox. This is shifted in conventional manner by a rotating drum and three forks.

Following Honda design practice, both the engine and transmission parts are pressure-fed by the same oil pump, drawing cool oil from a detachable two quart sump located beneath the horizontally split crankcase. The main oil gallery across the bottom of the engine supplies each of the four main bearings and two other oilways. From one pair of mains, oil is picked up to take care of the rods. Oil runs back to twin feeds to the gearbox

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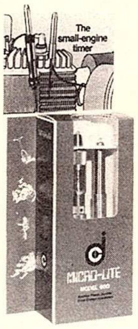

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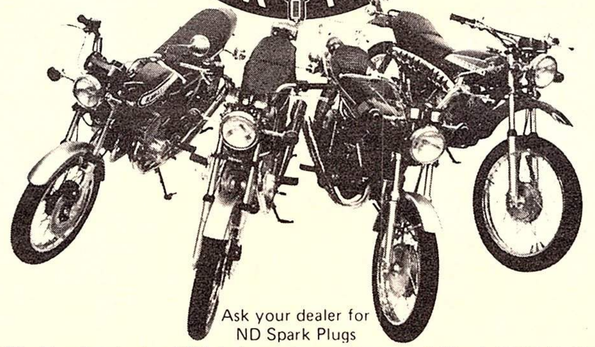

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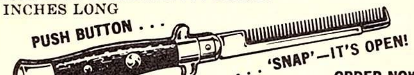

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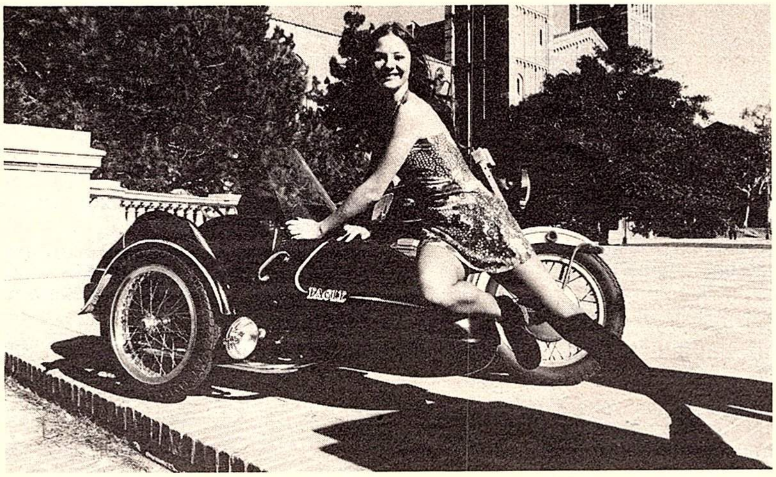

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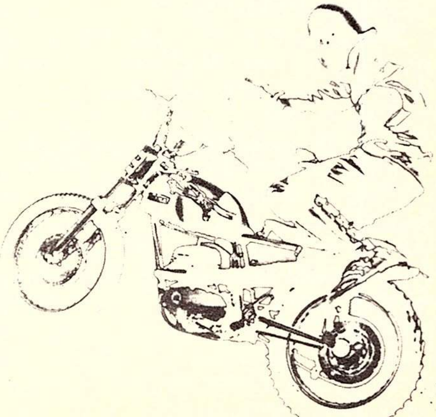
shafts, and up into the bolted-up block of two cylinders, then tees and enters the head in two places. These two supplies are routed to the tappet guide blocks, lubricating the tappets and cam lobes. Splash takes care of the cam bearings, while returning oil flows downwards over the valve springs, cooling them before entering the central gear tower for the long drop back to the sump below. On the way, the oil must pass through small sieves, whose purpose is to trap the debris of any cylinderhead disasters so it can't get into the rest of the engine.

This is a lot of machinery, and the weight of this engine is considerable at 132 pounds, which is four pounds more than the four cylinder GP engine of the same period. Other Honda racers were much more successful, which is to be expected, since the CR's were a compromise between performance and simplicity, while the championship machines were built to win without regard for price.

However, the CR-72 and its more famous brothers were built on the same basis of engineering innovations and design philosophy; set the bmep at a level that guarantees a flat torque curve without "tuning bumps" through the use of advanced valve gear, then select the number of cylinders that will permit the rpm necessary with that bmep to give competitive horsepower.

The CR-72, and indeed all of the four-stroke racers Honda built in the 1960s are ready for the museums now, but they have left their mark, not only in the record books, but on current practice in high-output engine design. Then, too, they've left their mark on each of us who followed them through their career at a magazine's distance, or close enough to hear the unearthly "Whoop-whoop-whoop" of the six warming up, or to see Mike Hailwood show his posterior to the competition.

As the rumors of new Honda participation in roadracing increase for the n-th time, I really want to see it happen. If and when it comes about, the machines will be full of new thought, whether two-stroke or four (or other), because they are very clever people at Honda. They hire only "A" engineers. And it will be fun. ◉



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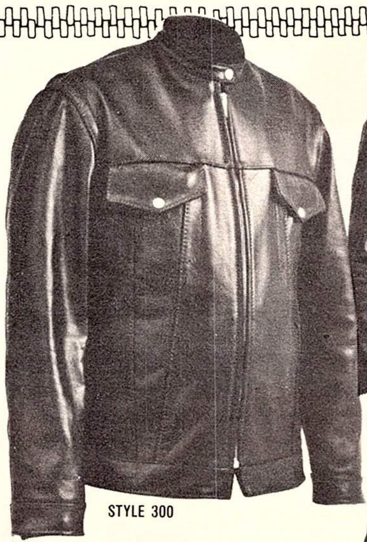

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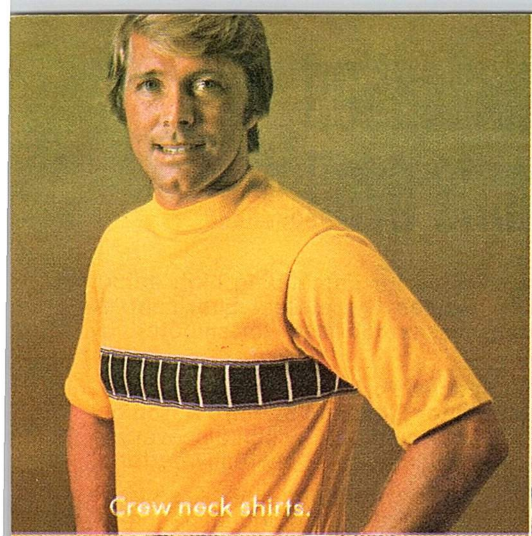
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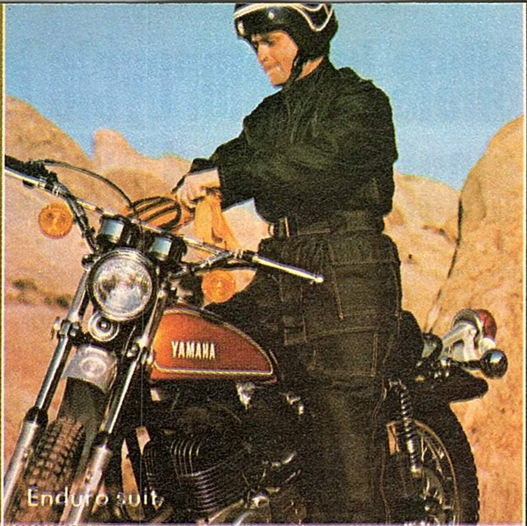
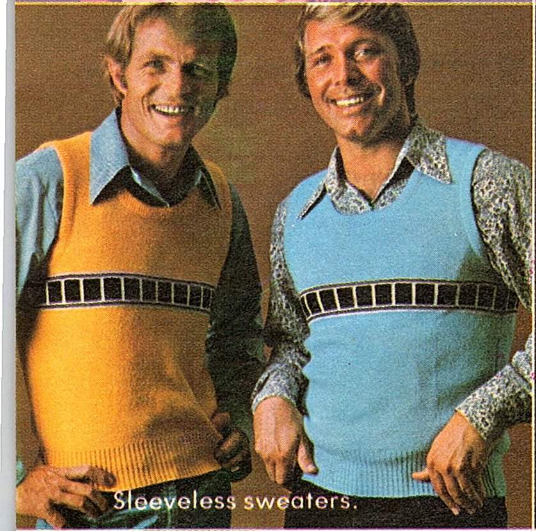

Enduro suit.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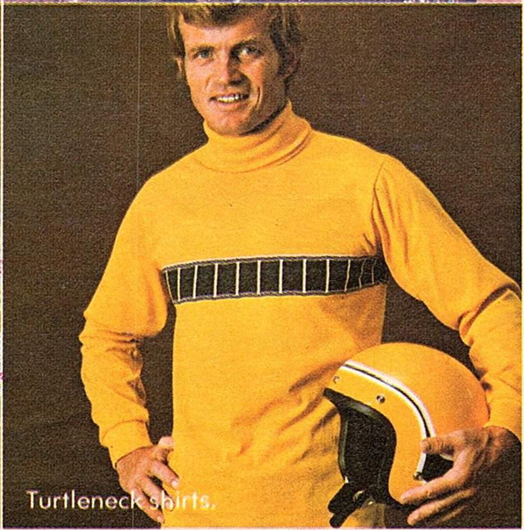
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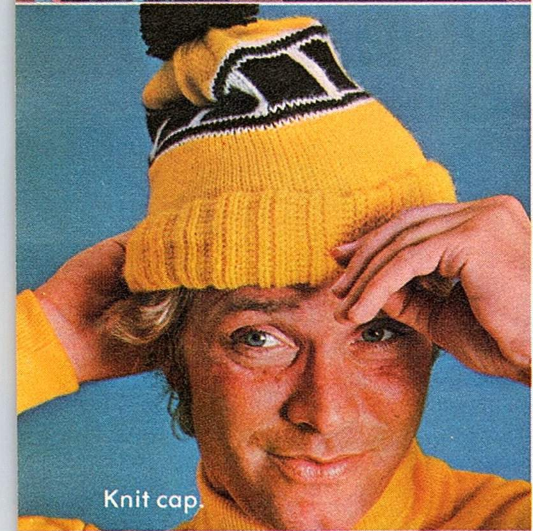
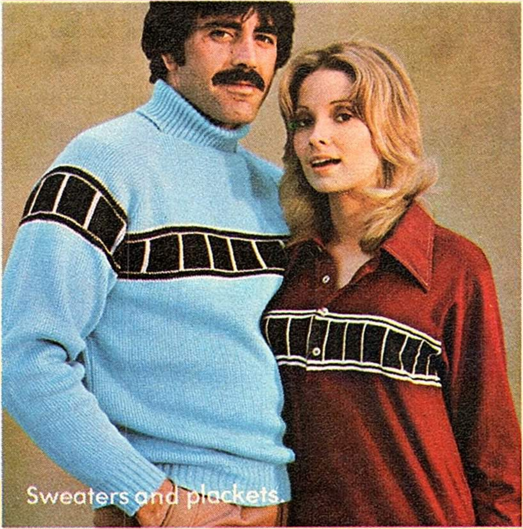
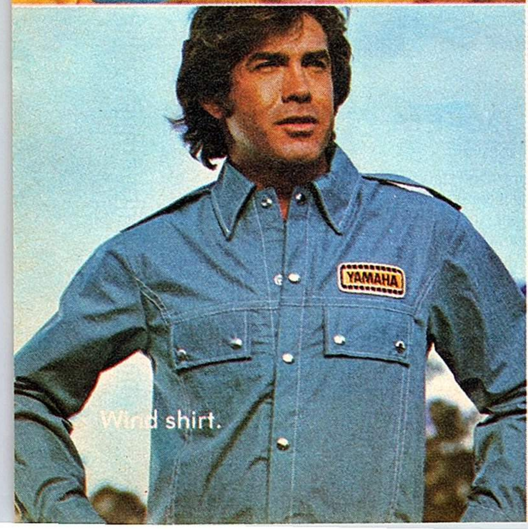
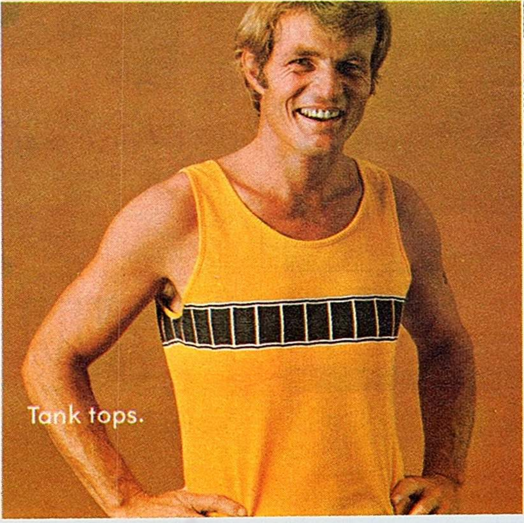

Knit cap.


Sweaters and plackets.


Wind shirt.


Tank tops.

KAWASAKI 750 *Continued from page 81*

the kick lever's shank and your own are trying to occupy the same space at the same time. The lever nestles hard against the inside of your calf if you like to ride with your knees against the tank, and if you don't keep your knees against the tank the wind will keep forcing them apart. Kawasaki should either put a curl in the kick lever to bring it in closer, or widen the tank, which could increase the fuel capacity of this short-range motorcycle to something a little more useful. The tank holds just over a hundred miles and in some areas that's not enough.

Apart from the deficiencies already noted (the footpegs that are ever so slightly too far forward) the Mach IV is now a fairly comfortable road machine. The seats/pegs/handlebar relationship is good, if not perfect (which may be an impossible goal, given the diversity in rider configuration) and the famous series H2 engine vibration has been brought under control at least to such extent that the bike is quite tolerably smooth if you're content with a sedate, legal 55-mph cruising speed. The difficulty you encounter in attempting to ride sedately is that all the urge built-in and there for the asking often is too much to resist, and the bike doesn't want to let you be restrained. At 55-60 mph you're using so little of the available power, and applying so little throttle, that the cylinders don't scavenge decently. The trickling breeze coming up through the transfer ports just won't clear away the residual exhaust gases. So the Mach IV's engine bucks and stutters when you try to ride conservatively, and the lash in the transmission engagement dogs converts the engine raggedness into a most remarkable snatching and banging in the drive chain. All of this is very annoying. However, it will give you something to tell the policeman who grabs you for doing a gargle-free 65 mph and the occasional clanging from the chain will remind you to pull the little knob that then dribbles a shot of SAE30 oil down on the links and rollers.

The chain oiler knob is half-hidden in the shadow of the Kawasaki's left sidecover, that triangular pan with the glittering "750 MACH IV" inscribed in chromed numbers and lettered decals. Pay close attention to the panels' fastenings before you try taking them off to get at the battery or oil reservoirs. Many bikes have their panels secured just by prongs held in rubber grommets, which is what you see looking down at the tops of those on the triple. But then, stooping a bit lower, you'll also see a security bolt, inserted through a metal tab that will get bent if you grab the panel and haul away.

A couple of feet forward from the chain-oiler knob is another knob and it adjusts the Mach IV's steering damper. You can have a lot of fun experimenting with different adjustments; we couldn't tell if one setting was better than another,

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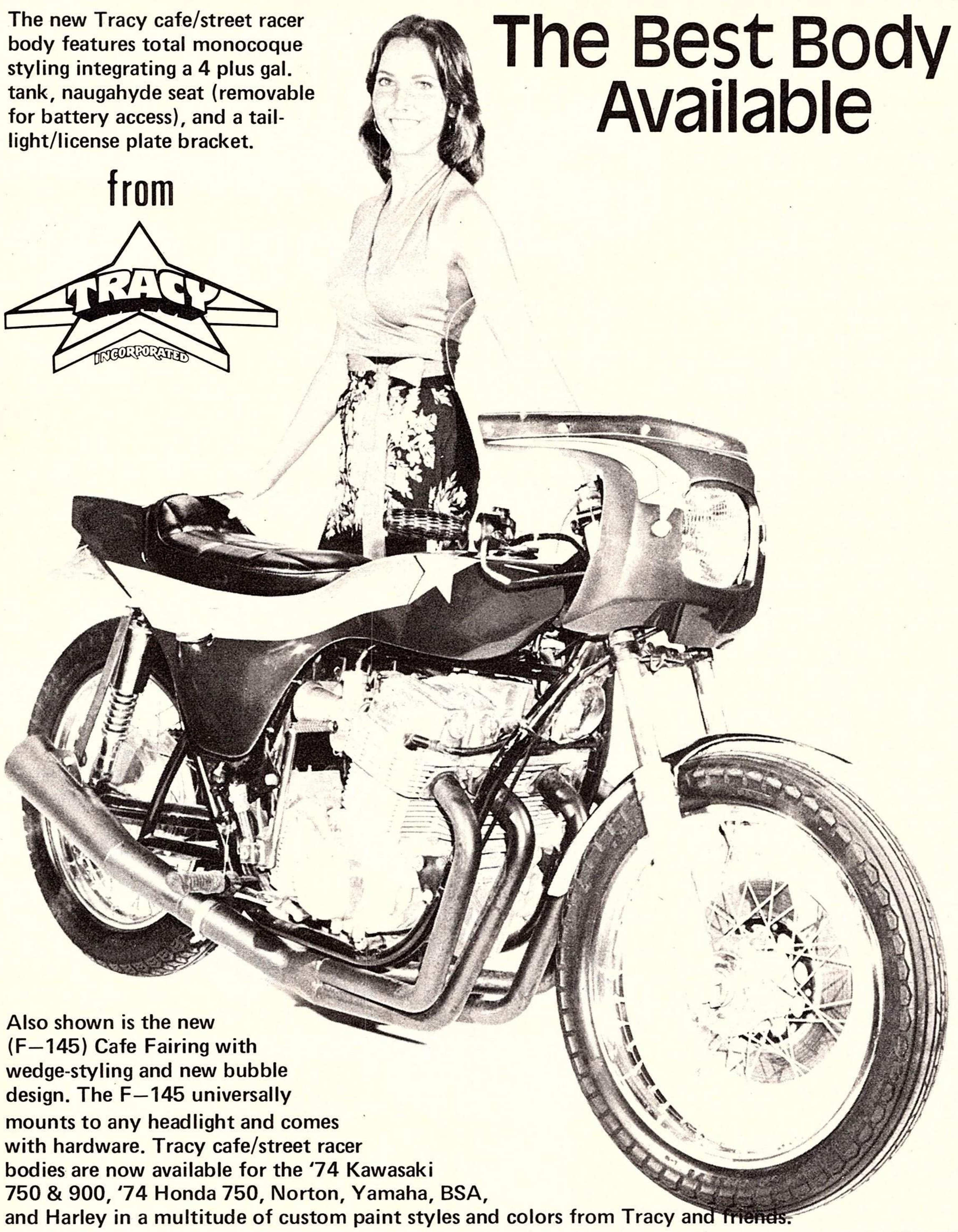

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as the motorcycle behaved itself whatever we did. Still, it's nice to see something on a bike that's as neatly thought-out as Kawasaki's horizontal shock absorber. Hydraulic steering dampers are always better than those that rely on friction discs; Kawasaki has been especially clever in compensating for internal volume changes and external adjustments by running the damper rod all the way through the damper body.

As a matter of fact, you can have a lot of fun with several of the Mach IV's features—particular emphasis being on the machine's performance. The big Kawasaki triple may use too much gasoline in getting where you want it to go, but it will get there faster than any other production vehicle on the road. Even when you aren't using the performance you can ride around with an inner smirk, knowing that the bike under you is the undisputed King of the tire-lighters. It may be a king who's a little out of touch with the times; it *rules* for all of that. So the vibration blurs the rear view in its mirrors, you can steady them by squeezing hard on the handlebar grips—and if you use the performance you'll be doing plenty of grip-squeezing in any case. You can luxuriate in the sheer, bountiful speed of the Mach IV, and enjoy its good points, one of which is a transmission that breathes a little life into the old wheeze about "shifting like a hot knife cutting butter." The old 750's transmission shifted like the gear housing was full of gravel; the new model sounds like the gravel is still there and maybe a pound of broken glass tossed in for company, but it shifts perfectly. (Now if only they had fixed the shift pattern to move neutral from its last-stop-down position to the more convenient and conventional slot between first and second.)

In all probability Kawasaki hasn't bothered to change the steering head angle, or fix the shift pattern, or do anything beyond detail improvement because they know it isn't going to matter. Federal regulation of noise and emissions and all manner of things the bureaucrat's mind can conceive loom just over Capitol Hill and that will kill off the Mach IV even if its own unruly nature would not. In time all the great Superbikes will have to go, pulled under by five mph bumpers and catalytic afterburners. Kawasaki's Mach IV, being the most super of all the Superbikes, will simply be the first to fall. And then someday, when we have super bikes but no Superbikes—if you grasp the difference—we'll remember the big triple, all its character flaws and single, shining virtue, and it truly will seem very remote, truly a relic of the past. Those who experience what the Mach IV still can offer will remember it fondly. The others? They'll see nothing but old dinosaur bones, forgetting that both the mesozoic thunder lizard and Kawasaki's thunderous Mach IV really were pretty good ideas at the time. ◉

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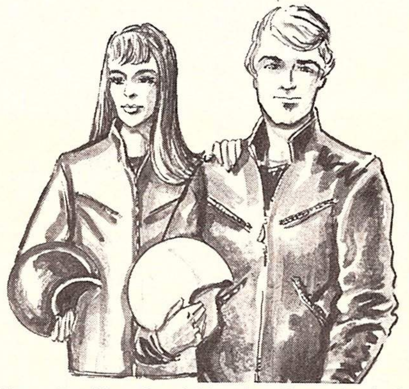

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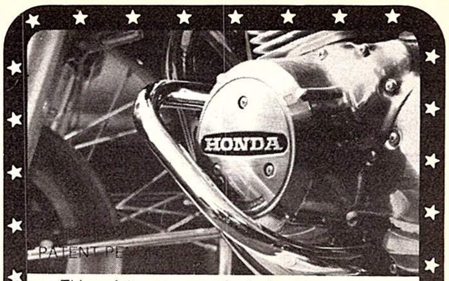

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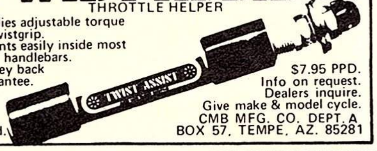

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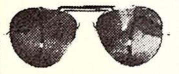

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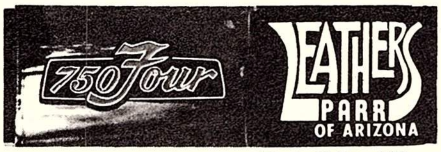

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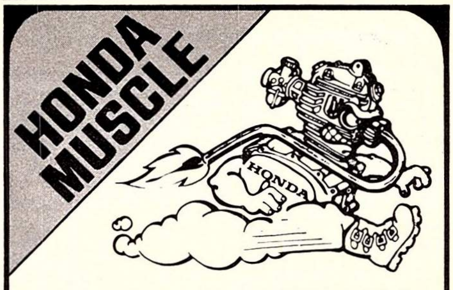

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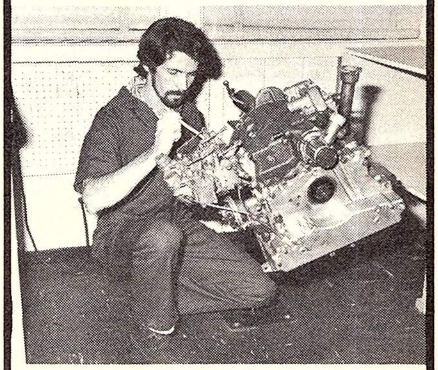

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I Am A Veteran ☐ 322

Free Information Service

Here's how you can get additional information at no charge, concerning products and services advertised in this issue, and items mentioned in the New Products Editorial Section.

1. Clip one of the coupons (two are provided in the event a second person reading this copy wishes to use the service). Print or type your name and address where indicated. Be sure to include Zip Code.

2. Please answer *all* questions and circle the number on the coupon which corresponds to the number at the bottom of the advertisement, or New Products Editorial Listing, for which you want additional information. (Key numbers for advertised products also appear in advertiser's index on the opposite page.)

3. Paste the coupon on a government post card or place it in an envelope and mail to:
CYCLE, P.O. Box 2904, Clinton, Iowa 52732

4. Your request for information will be forwarded to the appropriate companies. Please allow 4 to 6 weeks for them to fill your requests.

EXPIRES NOVEMBER 28, 1974 CC 10/74 1

Name____

Address______________________________________

City____________________State____________Zip Code________

PLEASE ANSWER ALL QUESTIONS BELOW AND TYPE
OR PRINT AS CLEARLY AS POSSIBLE

1. How many motorcycles do you now own?
A ☐ 1 B ☐ 2 C ☐ 3 or more D ☐ None

FOR MOTORCYCLES CURRENTLY OWNED, PLEASE COMPLETE THE FOLLOWING:

Answer for most recent purchase if more than one is owned.

2. What make?
A ☐ BSA D ☐ H-D G ☐ Kawasaki J ☐ Suzuki
B ☐ BMW E ☐ Hodaka H ☐ Norton K ☐ Triumph
C ☐ Bultaco F ☐ Honda I ☐ Ossa L ☐ Yamaha
M ☐ Other

3. What engine size?
A ☐ 40-99cc D ☐ 300-399cc G ☐ 600-699cc
B ☐ 100-199cc E ☐ 400-499cc H ☐ 700-799cc
C ☐ 200-299cc F ☐ 500-599cc J ☐ 800cc & up

4. Excluding motorcycle(s) currently owned, had you previously owned a motorcycle? 1 ☐ Yes 2 ☐ No

If YES:

5. What make? (Most recently owned, if more than one.)
A ☐ BSA D ☐ H-D G ☐ Kawasaki K ☐ Suzuki
B ☐ BMW E ☐ Hodaka H ☐ Norton L ☐ Triumph
C ☐ Bultaco F ☐ Honda J ☐ Ossa M ☐ Yamaha
N ☐ Other

6. What engine size? (Most recently owned, if more than one.)
1 ☐ 40-99cc 4 ☐ 300-399cc 7 ☐ 600-699cc
2 ☐ 100-199cc 5 ☐ 400-499cc 8 ☐ 700-799cc
3 ☐ 200-299cc 6 ☐ 500-599cc 9 ☐ 800cc & up

7. Do you plan to buy a new motorcycle within the next 12 months?
A ☐ Yes B ☐ No

If YES:

8. What make are you most seriously considering? (Check ONE.)
A ☐ BSA D ☐ H-D G ☐ Kawasaki J ☐ Suzuki
B ☐ BMW E ☐ Hodaka H ☐ Norton K ☐ Triumph
C ☐ Bultaco F ☐ Honda I ☐ Ossa L ☐ Yamaha
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B ☐ 100-199cc E ☐ 400-499cc H ☐ 700-799cc
C ☐ 200-299cc F ☐ 500-599cc J ☐ 800cc & up

10. How much do you plan to spend on motorcycle *accessories* (e.g. protective clothing, goggles, special instruments, tools, mirrors, etc.) within the next 12 months?
1 ☐ Less than $30 3 ☐ $50-$59 5 ☐ $100-$149 7 ☐ $200-$299
2 ☐ $30-$49 4 ☐ $60-$99 6 ☐ $150-$199 8 ☐ $300 or more

11. What is your age?
A ☐ Under 18 C ☐ 21 - 24 E ☐ 35 - 44 G ☐ 55 - 64
B ☐ 18 - 20 D ☐ 25 - 34 F ☐ 45 - 54 H ☐ 65 or over

For information on items circle numbers below.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100					

EXPIRES NOVEMBER 28, 1974 CC 10/74 12

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100					

LETTERS *Continued from page 27*

I packed up, took a weeks vacation and me and my trusty rambler (425 miles to [1] tankful [15 gallons] of gas, better by 2 mpg and 345 miles than my RD-350) slipped down to where its-at; Los Angeles! San Diego! Lake Arrowhead! Disneyland! Downtown Burbank! Billions of people! 280 miles of bumper-to-bumper jams!

The desert has died. Nine years of brush-beating has removed any taste for desert torture. Nine years of beauty creates a soul even in the most unfeeling no longer able to co-exist with the unescapable garishness that is California.

Bigness tends to exclude all except its own bigness, becoming convinced in the process that is bigness IS all. . . . To an outsider, of course, it all appears absurd. Life is too small to accomodate only one facet of a universal idea. Translated, this means that although there are more bikers in So Cal than anywhere else (hence more bike bucks), nowhere else is biking as restrictive, confined, inbred as it is in So Cal.

Witness Kawasaki's blasé 400 four-stroke. Trinkety outside, grey inside. Introduced obviously for the So Cal market. The Honda 350 twin was the most un-fun bike in the world to ride—mediocre in every way, including reliability. Perfect for the suburban San Diegan. Give me the world of the 350 Yamaha.

Life is a pasture of cows at full tilt, a breeze fresh off pine forests ridden slowly, a country town with announced bigotry, the villa of open acceptance. . . . Riding is dust and unused raingrooves only in a small percentage of the country, yet this percentage dreams it IS motorcycling. Again, so be it. I enjoy reading fiction; I no longer enjoy living fiction. . . .

Bill Wolter
McMinnville, Ore.

C'EST LA VIE

Since talking up cycling last year and buying your magazine I have really enjoyed my spare time.

I myself ride a '73 Honda 350 Four. I'd rather have a 750 but you know how it is.

Keep up the good job which I'm sure you will.

John Law
No Address

BSA BANTAM BOOSTER

My girlfriend and I couldn't help laughing at your "Little Monsters" article. Just what are you doing with the fuel? We have a pair of old, battered BSA Bantams, 175 cc two-strokes, with roughly the same performance, and both machines return over 80 mpg. During a tour of Cornwall last year one machine consistently returned 105 mpg. On the other hand we wouldn't recommend them as a "best buy." Handling, lights and brakes are rather poor. Since we are both students and very poor, things that cost money tend to be neglected; we generally buy second hand bits when possible, hence the lengthy lay-offs if something major does break down. Even so, these damn bikes have carried us more miles than any of the previous 15 machines I've owned. The most expensive machine I've owned was a Velo, and that drove me, literally, to drink before I managed to sell it to an ex-friend, and he only saved his sanity by buying a Triumph.

Small bikes suit our type of riding. We never choose the trunk roads if we can find a back lane. These have very little traffic and plenty of bends, much more fun to ride, and lots of fresh air. The main roads are too crowded and sitting behind diesel wagons breathing in thick black exhaust smoke makes me sick. I believe that there is a law against such events, but it is rarely enforced. Besides, the standard of driving in England is pretty bad.

Another thing while I'm at it. Stop knocking the World Championships; nobody is stopping the Americans from entering. In fact, I would welcome it. After the Anglo-American match races, I'd like to see more of your lads over here. The competition would really liven things up. Kenny Roberts had us on our toes at Mallory Park. It would be nice to have an American team at the Isle of Man. The course will die if we don't get the stars back. After all, the Europeans are moving into Daytona, and winning, so come over here and get your own back.

Keith Williams
Leicester, England

HIGH SCHOOL MX

I just finished reading the June issue of *Cycle*, and I was very impressed with Cook Neilsons' editorial on High School MX. With the right and proper attitude, MX in school could bring not only the sport better riders, but the school more pride in its students and students more pride in their school. After reading the reports of several races held by schools, it appears that the trend is growing at a very rapid rate. I hope that other states and schools will look into this new form of sporting event and support it.

Gregg N. Woodruff
Merritt Island, Fla.

QUICK AND DIRTY

This month I took delivery of a 1974 Kawasaki 750 H-2B. Inspired by your December 1973 article on dual-disc conversions, I placed the caliper on the rear of the front fork. But I did it quick and dirty; I turned the entire front fork and front wheel around 180°. Result—the speedometer went dead and the odometer ran *backwards!* What happened, of course, was that the speedo drive in the wheel was also reversed, or rather, the wheel now turned backwards in relation to the speedo drive's mechanism. There were two possible cures for this problem. The first was to put the disc caliper on the back on the right side, move the disc from left to right, and remove the dust shield on the hub opposite the speedo drive. I wasn't wild about exposing the bearings, so I took the other course. A right-hand caliper (for a dual-disc set-up) was placed on the rear of the left, a shortened hydraulic pipe was fabricated, and a Z-1 speedo cable was used (because it was a little longer than the stock H-2 cable). Everything works quite well now, the appearance is clean, and I have the (apparently) improved handling stemming from the single caliper mounted near the steering axis. But if I were not parts manager of a Kawasaki dealer, the project might not have turned out so well, or might even have been abandoned.

David Jacobson
New York, N.Y.

MODEST PROPOSAL

I buy your magazine all the time, however, I don't subscribe to it. Getting to the point, I don't expect an answer to this letter, I just want to provide some food for thought;

1 You've road tested a lot of bikes.

2. A lot of people (including me) respect your honesty when you test bikes.

3. A lot of people have a lot of different reasons for wanting road tests (and, I might add, even some of the bikes that aren't made any more).

Get what I've been hinting at? Right. Why not sell reprints of your road tests—in sets (all Hondas in one set etc.), or why not sell capsule tests? Series tests?

As I said, it's only food for thought, I sure hope you consider it.

John Salustro
Port Alberni, B.C.
Canada

XL 250

Having arrived here recently after driving Buenos Aires—Tierra del Fuego—Mexico, not far short of 14,000 miles in all, with not a single *engine* problem I must say "hear hear" to your remarks concerning the XL 250's reliability.

This was my first bike and my total riding experience before shipping the machine from England to Argentina was 1000 gentle miles back home. So I have no basis of experience for comparison, but a bike which can take me and 90 lbs of equipment to over 17,000 feet, which can return mileages of up to 75 mpg (Imperial gallons!), which in the "traffic-light states" can see off most cars etc., etc. seems a pretty satisfactory $900 worth. So much so that I am seriously considering doing an about turn and heading south again.

Stephen Saker
Mexico City, Mexico

PARTS ONCE USED

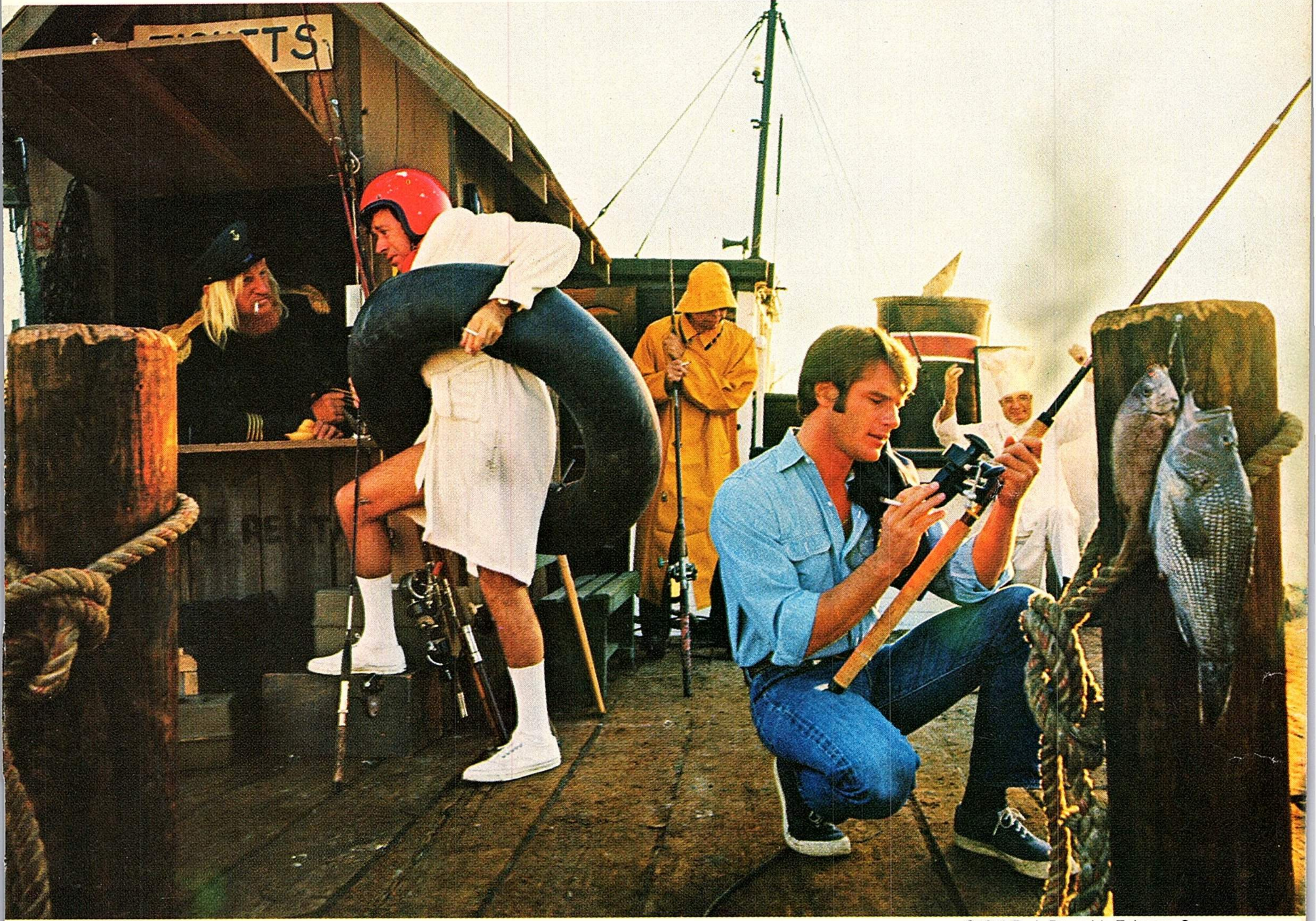
I just read your article on the salvage shops and they are just what I am looking for. I would like information on whether there are any of those shops in the east (New Jersey, New York, Pennsylvania, preferably.)

Thank you very much,

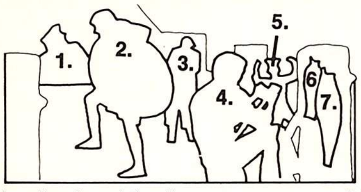
O. Smith
Berk Hgts, N.J.

If any salvage yards would like to respond, Cycle *is willing to print their complete addresses.—Ed*

Can you spot the Camel Filters smoker?



© 1973 R. J. Reynolds Tobacco Co.



Almost everyone going fishing today has a gimmick. Pick the one who doesn't. **1.** No. He's called "The Ole Skipper" by his landlord and the finance company. Gimmick: Never sails without a good tide, fair winds, and his rubber duckie. His hard-drawing cigarettes are like a cheap lighthouse—they blink twice, then go out. **2.** Nope. He's Tim Idsol, known as "The Codfather." Gimmick: Takes no chances. Even smears shark repellent all over himself—doesn't know it's really meat tenderizer. His "Long-long" cigarettes send the smoke so far, it carries an overnight bag. **3.** No. He's Stu Mack Paump. Makes all sea trips "by rail." He even gets seasick watching his shorts go around in the laundromat. His cigarettes have so much charcoal in the filter, he's had to join the miners' union. **4.** Right. He's here to catch fish—not the latest fads and gimmicks. Wants no nonsense in his cigarette, either. Camel Filters. Good taste. Honest tobacco. **5.** He's the cook, Phil Layasol. His meals are so bad, African pygmies come to dip arrows in his soup. **6.** & **7.** No and no. They're porgie and bass.

Camel Filters. They're not for everybody
(but they could be for you).

Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.

19 mg. "tar," 1.3 mg. nicotine av. per cigarette, FTC Report MAR. '74.

MI-175

MT-125

ME-125

ME-100

MT-100

ML-100

THE *Indian* MOTORCYCLE

CIRCLE NO. 22 ON READER SERVICE PAGE.

MX-76

MX-74

JX-50

JC-5A

M5-A

MM-5A

THE INDIAN MOTORCYCLE COMPANY *110 N. Doheny Drive, Beverly Hills, Ca. 90211 · (213) 278-9470*